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American Method of Treating by Distillation the Zinc-Silver-Lead Alloy, Obtained in the Desilverization of Lead.*

BY A. EILERS.

ALTHOUGH the process to which I refer in this paper has been in successful operation for nearly five years, during which time it has been introduced, superseding all other processes having in view the same end, in almost every lead refinery in the country, no description of it, giving economical data, has ever appeared in print, nor has the process been known in its details to any considerable number of engineers beside those conducting it at their works.

A discussion of this subject at the present time becomes especially interesting in view of a late publication in the Prussian ministerial organ for Mining and Metallurgy, by Dr. WEDDING, in which the method of treating the zinc-silver-lead alloy by distillation, as finally settled upon at Tarnowitz, is very minutely and fully described. It is the more interesting, because in that article reference is made to the American method in an unfavorable light, while, at the same time, it is clear from the article itself, that the most important details of the process, besides the one that it is conducted in black-lead retorts, were not at all understood. In publishing herewith the details of our American method, one of my objects is to invite comparisons between our simple and direct process and the elaborate one at Tarnowitz.

In extracting the silver from work-lead by means of zinc, it is always the intention, in this country, to obtain a zinc-crust so rich in silver that the rich lead resulting from subsequent distillation contains from 8 to 10 per cent. of silver, or even more. Where the ordinary work-lead of the Western smelting works, containing from 100 to 300 oz. of silver per ton, is treated, from 1.4 to 3 per cent. of zinc is used, and it is only necessary to use the 2nd and 3rd additions of zinc again in a subsequent operation, as addition No. 1, in order to bring them up to the required standard, the No. 1 of the first operation being already rich enough for the purpose contemplated. When poorer work-lead is treated, (which, by the way, does not often occur,) the same object is reached by the repeated use of the No. 1 zinc addition, as above mentioned, in regard to additions 2 and 3 of the ordinary process. One object in making the zinc-crust so rich in silver is to render it less liable to oxidation in the following liquation; another to shorten and, therefore, cheapen the distillation itself.

The rich zinc-crust is liquated, at some works in reverberatories, at others in kettles standing for that purpose near the large desilverization kettles. It is, however, always the aim, *not to produce any oxides*, and for that reason the temperature is kept exceedingly low, and access of air is limited as much as possible. In this fact lies the fundamental difference between our American distillation and that at Tarnowitz. In carrying liquation not near so far, and therefore not producing any oxides, we get rid at once of an immense amount of work, which the oxides formed at Tarnowitz occasion; and our immediate product of silver reaches, in consequence, a far higher percentage.

The liquated zinc-crust was subjected to distillation, before 1870, by Mr. BALBACH of Newark, but the process was at that time very expensive, in consequence of the frequent breaking of retorts, which cost from $14 to $16 a-piece. The retorts then used were made of the same material and of the same shape as those used to-day. They are made of New Jersey clay and chamotte, and contain about 25 per cent. of plumbago. But at that time the neck of the retort had to be freed from the surrounding brick, and lowered every time at the end of a distillation, and this handling of the retort, while white-hot, caused frequent breakage. This most serious objection to the process was, however, removed in 1870, by the invention of Mr. A. FABER DU FAUR's tilting retort-furnace, which has since been introduced in the majority of works in this country. The accompanying drawings, Figures 1, 2, 3, 4, 5, represent this furnace and require no further explanation.

The process of distillation now is as follows: The retort-furnace is heated gradually by means of coke,* until the retort has become dark red. Then it is charged by means of a small copper shovel with liquated zinc-crust, which has previously been subjected to what is incorrectly called granulation, *i. e.*, after having been taken from the liquation furnace, it is spread, still soft, on a clean iron plate in front of it, and here cut up, by means of a shovel, into pieces of about 1 to 1½ cubic inches. According to the richness of the alloy, and the size of the retort, a charge filling the retort to the neck consists of from 250 to 400 lb. of alloy, with which from 3 to 5 pounds of small charcoal of bean to nut-size have been mixed. Next, the condenser is put on; this may either be made for the purpose, being in that case simply a truncated cone of fire-clay, about 2 feet long and of an inside diameter at the base a little larger than the outside diameter of the retort; or it may be an old retort, which it is unsafe to expose to the white heat required for distillation, and which is thus made to do duty for a while longer. The temperature is then at once raised to *white heat*, and kept so until the distillation is complete. The operation lasts from 8 to 10 hours, according to the percentage of zinc in the alloy. During all this time it is only necessary to keep the retort uniformly at a white heat. If this is neglected, a crust of chilled alloy is apt to form on top of the metal-bath, which, upon a renewed raising of the temperature, would cause an explosion in consequence of zinc-fumes suddenly developed under the crust. An occasional introduction of a small iron rod into the retort through the condenser serves to show the workman whether he has kept the temperature high enough. Experienced men never make a mistake in this respect. The metallic zinc, collecting in the condenser, and retained there by a rim of blue powder and oxide of zinc, forming around the mouth, is from time to time tapped, and the blue powder and oxide are quickly scraped into iron vessels, from which the air can be excluded, the object being to prevent the oxidation of the blue powder. When sufficient metallic zinc has thus been collected, it is re-melted in a kettle under a coal-covering; the oxide and impurities are taken off, and the metal is cast into plates which are again used for desilverization. From 40 to 50 per cent., and sometimes more, of the zinc

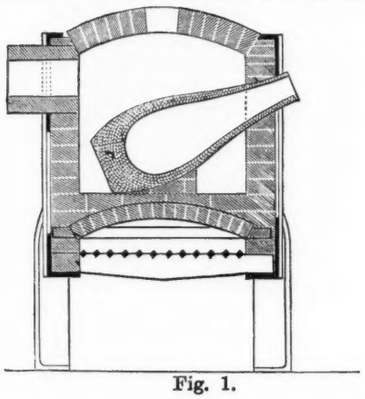


Fig. 1.

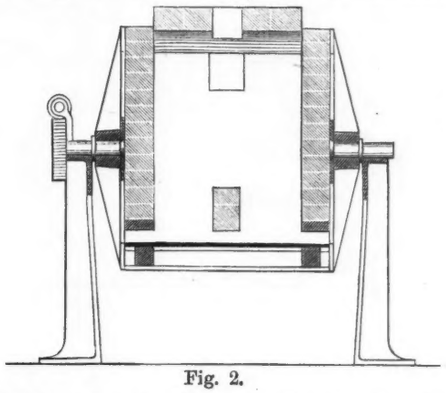


Fig. 2.

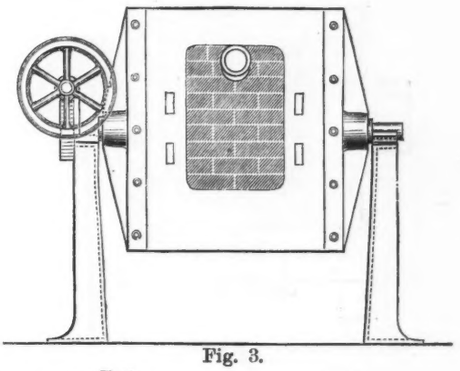
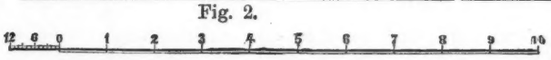


Fig. 3.



* A paper read before the American Institute of Mining Engineers, at the New Haven Meeting, February, 1875.

* At one works in the West, crude petroleum is said to have been used instead of coke. This is probably so far advantageous, as thereby the formation of slag accretions on the outside of the retort is prevented.

originally added to the work-lead, is thus regained in the form of plates, which contain only a trace of silver. The blue powder and oxide, containing no more silver than the metal, and comprising about 10 to 20 per cent. of the original zinc, are sold to zinc works. Thus, about 50 to 70 per cent. of the original zinc are obtained again, the remainder having been partly retained by the desilverized lead, the contents of which in all cases amount to the somewhat constant figure of 0.7 to 0.8 per cent. of zinc to the whole mass of lead, and partly lost as oxide escaping from the mouth of the condenser.

When, in spite of a continued white heat, the zinc vapors are developed only very sparingly, the process is carried as far as policy permits, the rich lead containing then still a trace of zinc. At the same time it is desired that the zinc contents of the rich lead should not be more than a trace, in order that serious losses from this cause may be avoided in the subsequent cupellation. The condenser is then taken off, so that the zinc fumes, still in the retort, may more readily escape, and the furnace is left to itself for a few minutes. Meanwhile a small two-wheeled wagon, carrying a cast-iron pot, lined with moulder's sand of the iron-casting houses, is brought in front of the retort, and by tilting the whole furnace, the rich lead is transferred in a stream to the kettle. After having here cooled a while, the metal is poured into lead moulds, previously washed inside with lime milk, and well warmed, by tilting wagon and basin together. These moulds are only half filled, in order to produce thin bars, which are handier afterwards for gradual addition on the English cupelling hearth. The residue remaining in the retort after the discharge of the rich lead, and consisting of a little charcoal and slag, is scraped out with an iron hook, while the retort is yet tilted. The larger pieces of coal go back into the retort in the next distillation. The small stuff and slag is kept separate, and is afterwards added in the smelting, during which the rich litharge is reduced, or sometimes it is immersed in poor-lead. The entire quantity, produced during any one distillation, should, after sifting out the large coal, not weigh over a pound or two. If no dust or dirt has been allowed to get into the alloy before distillation, and if the temperature has been kept high enough during that process, including the discharge of the retort, the remaining scraps will always be found insignificant.

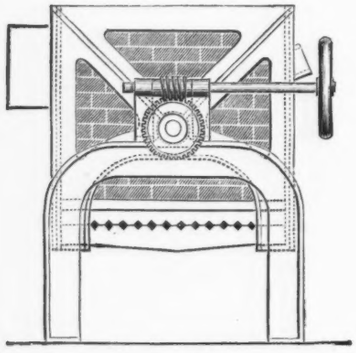


Fig. 4.

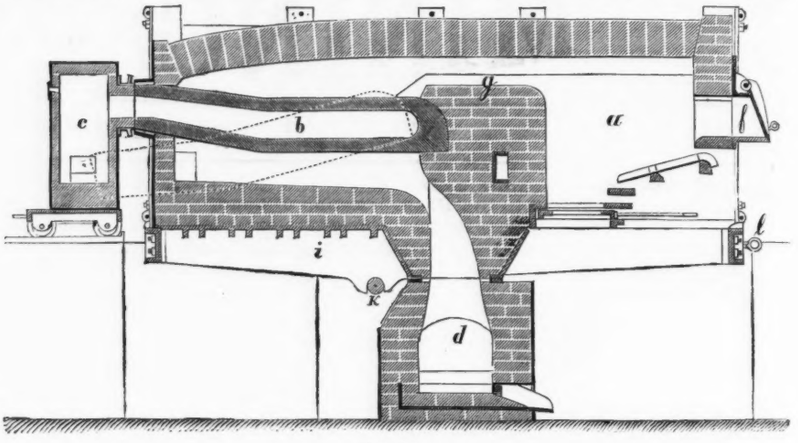


Fig. 7.

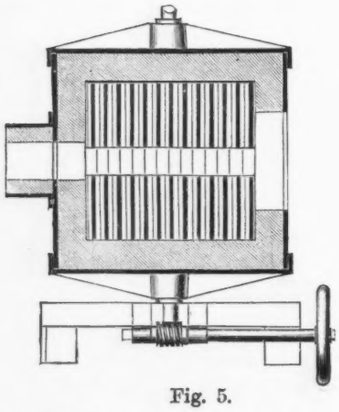


Fig. 5.

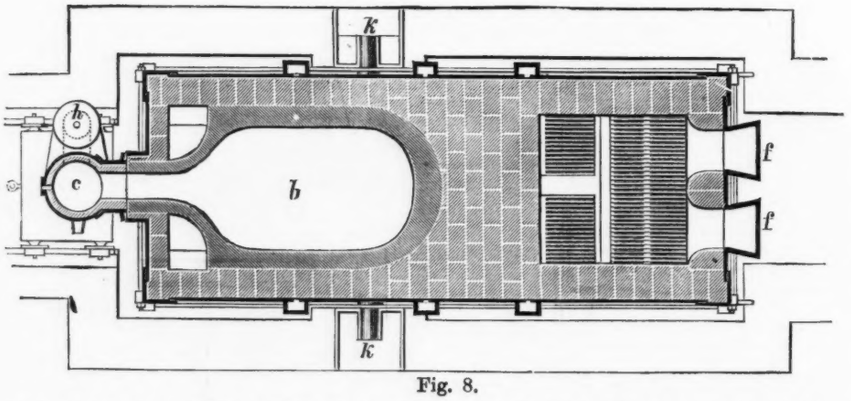


Fig. 8.

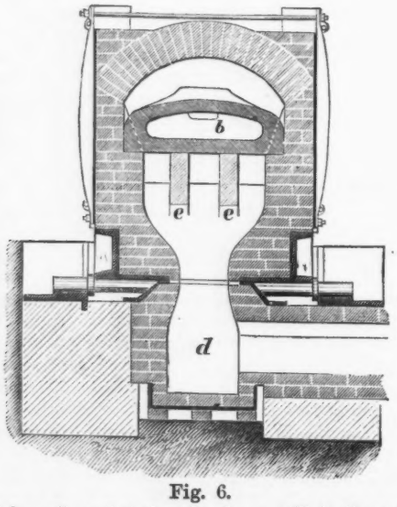


Fig. 6.

A handful of fine charcoal dust is now thrown into the discharged retort, the object being to prevent the oxidation of small lead globules, because litharge once formed would soon destroy the retort. Next, the furnace is turned back to its original position, the grate is cleaned, accretions of melted ashes, which may have formed on the sides, are broken off, there is new coke added, and the retort is at once filled with a new charge. A retort outlasts now from 15 to 30, or an average of about 20 distillations, the retorts becoming unserviceable principally on account of accretions on the outside, which are melted coke ashes. To obviate this, firing with crude petroleum, and flame-fire from gas-generators have been proposed. Both ways are, no doubt, practicable, and the latter especially will result in a large saving in fuel.

The following are the results of two campaigns of the Pennsylvania Lead Co. at Pittsburgh, for which I am indebted to Mr. E. F. EURICH, the metallurgist and superintendent of the works. In one of these, unrefined work-lead, as it comes from the shaft furnace of the company, was treated; in the other, work-lead refined before melting it down in the desilverization kettle.

I. DESILVERIZATION OF WORK-LEAD DIRECT FROM THE SHAFT-FURNACE.

To the kettle; impure work-lead	87,294 lb.	
Taken off: "Schlicker" (cupreous oxide)	3,497 "	
		ag. oz.
Remains: pure work-lead	83,797 lb.	with 6,305.6
To this was added: zinc	1,760 "	= 2.1 per cent.
The zinc-crust after liquation was	9,525 "	
"Abstrich" from dezincation of poor lead	7,810 "	
Oxides and metallic lead from market kettle	1,000 "	
Lead from liquation of zinc-crust	808 "	
Market-lead	67,104 "	

DISTILLATION OF LIQUATED ZINC-CRUST.

The liquated zinc-crust was subjected to distillation in 27 charges. Average charge 353 lb. of alloy with 3-4 lb. of small charcoal. In 24 hours two distillations were effected in each retort.

Charged : Liquated zinc-crust	9,525 lb.	
Charcoal	108 "	
Result : Rich-lead	7,609 "	
Metallic scraps	390 "	
Charcoal, with little metal	not weighed.	
Metallic zinc	770 lb.	
Blue powder and oxide	not weighed.	

Coke used : 410.4 bushels @ 40 lb. = 1.7 lb. per lb. of zinc-crust.

The metallic scraps were immersed in poor-lead on the cupelling test, and then cupelling was continued in the usual way, by adding rich-lead bars from time to time. By the immersion of the scraps in poor-lead, 230 oz. of silver were extracted from them.

Results :

1. *Control of Silver.*

In refined work-lead		6 305.6 oz.
Obtained and proved :		
Silver tapped from test 6098.75 oz. @ .989 fine	6,031.66 oz.	
Small pieces of silver from test 150 oz. @ .970 fine	146.50	
Directly obtained, silver	6,178.16	
Silver in market-lead, 0.33 oz. per ton in 67,104 lb.	11.18	
	6,189.34 oz.	
This leaves in litharge, hearth, retort-scraps, oxides and scum from immersion, and liquation lead	116 26 oz.	
	6,305 6 oz.	

And the direct product of silver is 98.1 per cent.

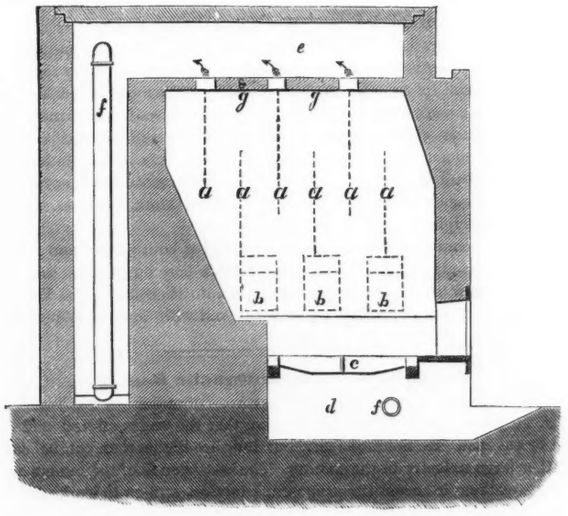


Fig. 9.

2. *Control of Lead.*

Unrefined work-lead		87,294 lb.
Obtained and accounted for :		
"Schlicker" 3497 lb. @ 80 per cent.	2,797 lb.	
Lead in zinc-crust	7,765	
Soft market-lead	67,104	
Oxide and Scum from market-kettle 1000 lb. @ 95 p. ct.	950	
Liquation lead	808	
Oxides from dezincation 7810 lb. @ 80 per cent.	6,248	
	85,672 lb.	
Loss—about 1.9 per cent.	1,622 "	

II. DESILVERIZATION OF REFINED WORK-LEAD.

To the Kettle : Lead	62,895 lb.,	with Silver 6,165.9 oz.
Added : zinc	1,360 "	
Produced : Liquated zinc-crust	6,362 "	
"Abstrich" from dezincation of poor-lead	3,500 "	
Oxides and metallic lead from market-kettle	700 "	
Market-lead	53,420 "	

DISTILLATION OF LIQUATED ZINC-CRUST.

The liquated zinc-crust was subjected to distillation in 20 charges. Charges and time required were the same as in the first campaign.

Charged : Liquated zinc-crust	6,362 lb.	
Charcoal	80 "	
Result : Rich-lead	5,221 "	
Metallic scraps, charcoal, zinc and oxides	not weighed.	

Coke used : 276 bushels @ 40 lb. = 1.73 lb. per lb. of crust.

The residue in the retort after the discharge of the rich-lead, *i. e.*, metallic scraps and charcoal impregnated with metal, was not divided into two classes, as in the former case, but was all kept together, to be added in the reduction of the rich litharge at some future time. There was, therefore, no immersion in poor lead in this case, and consequently, a smaller direct product of silver than in the previous campaign.

Results :

1. *Control of Silver.*

In refined work-lead		6,165.9 oz.
Obtained and proved :		
Silver tapped from test 5,714.5 oz. @ .989 fine	5,645.9 oz.	
Small silver pieces from test 115 oz. @ .970 fine	111.5	
Directly obtained	5,757.4 oz.	
In litharge, 5200 lb. @ 30 oz. per ton	78.0	
In market-lead, 53,420 lb. @ 0.33 oz. per ton	8.9	
		5,844.3 oz.
This leaves in hearth and retort-scraps		321.6
		6,165.9 oz.

And the direct product of silver is 93.3 per cent.

2. *Control of Lead.*

Refined work-lead		62,895 lb
Obtained and accounted for :		
Market-lead	53,420 lb.	
"Abstrich" from dezincation, 3500 lb. @ 80 per cent.	2,800	
Oxide and metallic scum from market-kettle, 700 lb. @ 95 per cent.	665	
Lead in zinc-crust	5,002	
	61,887 lb.	
Loss—1.7 per cent.	1,008	
	62,895 lb.	

In both campaigns above cited, the loss of lead, which will take place upon reduction and further treatment of oxides and other intermediate products, is not taken into account, as it could not be directly ascertained. From former experience, however, the total loss of lead in refining, *i. e.*, adding to what is given here, the loss in the further treatment of all middle-products, is from 3 to 4 per cent. of the original weight of the unrefined work-lead.

It is to be regretted that the direct proof could not be furnished, that the silver, *not directly* produced, is really all in the various intermediate products, given above. But as long as the works are not so situated that these by-products can be worked by themselves, this cannot be done, and we must be satisfied to find at the end of each year, when the balance is struck, that the supposition has been correct.

The only unsatisfactory feature of this American method of distillation is the large consumption of fuel, which is connected with it in the present apparatus. This has led to the construction of other furnaces, which are heated either by flame-fire or gas, and though at present the general results obtained are still doubtful, the saving of fuel intended is absolutely proved.

Of these furnaces I will here mention the two following :

1. The furnace constructed lately by Mr. FABER DU FAUR, which is represented in Fig. 6, 7, 8.

a Fire-place.
b Retort, holding 2000 lb.
c Condenser on small wagon.
d Flue.
e Supports for retort.
f Fire doors.
g Fire-bridge.
h Gas-escape, at one side, and near bottom of condenser—with movable cover for cleaning condenser, etc.
i Iron-beams, resting on shaft *k*, on which the whole furnace is tilted by means of a chain at *l*, running over a sheave above, or by means of a screw and screw wheel-sector, attached to furnace.

The furnace is heavily armed with cast-iron plates and cross-pieces.

The same apparatus can, by slight alterations, be adapted to gas fire. In this case the grate is lowered about a foot, and provided with under and over-blast, from hot-blast pipes arranged in the flue *d*. The top-wind, to ignite the gases, would have to enter in jets arranged across the inner edge of the fire-bridge.

The better way, however, proposed by Mr. FABER DU FAUR, is to have a separate and stationary gas-apparatus, so arranged that when the retort furnace is tilted, the fire-bridge will be lifted off from the combustion apparatus.

2. The furnace constructed by Mr. W. M. BRODIE, first at the Montgomery Works, near Bloomfield, N. J., and lately at the works of the Messrs. TATHAM, near Philadelphia. It is represented in Figs. 9, 10, 11.

a Retorts (center line.)
a' Condensers.
b Protectors.
c Grate.
d Ash pit.
e Flue.
f Blast pipes.
g Fire-brick tiles.
h Tapping bench.
i Filling bench.
k Spout.

This furnace contains 6 graphite retorts of the common pattern used in this country heretofore for the purpose of treating zinc-crust. They are arranged in two rows, the upper ones lying over the spaces between the lower ones in the position shown in the drawing. Fire-brick arches keep the flame from striking directly against the retorts. These are tapped, when ready for discharge, by means of ¼-inch holes bored in the lower edge of the bottom, the rich-lead being conducted into moulds through black-lead gutters. The fire-grate is provided with under-blast, which is heated in pipes lying in the main flue. The six retorts hold 2600 to 3000 lb. of zinc-crust, according to the degree of liquation that it has been subjected to. The time required for one operation in this furnace is from 12 to 20 hours, according to the material operated upon. Clean scum, resulting from refined work-lead, requires about 12 hours; impure crust,

CONTINUED ON PAGE 208.

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RICHARD P. ROTHWELL, C. E., M. E., ROSSITER W. RAYMOND, Ph. D., } Editors.

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To Our Correspondents.

WE have received a communication on the Rapid Transit Question, from "A Member of the Society of Civil Engineers." The rule requiring correspondents to give their names, "not necessarily for publication," obliges us to hold this over till we are favored with the name of the writer.

We have the same answer to make to "a subscriber," who asks a number of questions about the treatment of ores etc., etc., in Utah.

THE Pottsville *Miners' Journal* seems to be relapsing into the style of journalism which characterizes the mining camps of the far West, where the prevalence of gamblers, roughs and bad whiskey places journalistic ethics on so low a basis that billingsgate and personal abuse pass for wit and argument. This is a sad step backwards for a journal which we have been accustomed to consider as one of the best provincial papers on our exchange list, and with whose veteran statistical editor we have always maintained friendly relations. The *Journal* has long been promising us figures in support of its statistics of the coal trade which we consider incorrect. We shall be very much pleased to receive the promised statistics ; they will, whether correct or not, form a pleasant contrast with the foul language which the *Journal* has lately substituted for facts. We will take pleasure in giving the *Journal* credit for whatever they may contain of value.

More Light Wanted.

A CURIOUS editorial in the *Bulletin*, of March 19th, defines, in a suggestive rather than satisfactory way, the position of the American Iron and Steel Association, concerning the collection of iron ores, etc., for the Centennial Exposition. The following paragraph is the nearest approach in it to a frank confession :

"Once for all, we say here and now to all persons that it is not the business of the American Iron and Steel Association to do the work of the Centennial Commission, or of the State governments, or of private citizens who have ores and fuels to exhibit a year hence. It simply agreed a year ago to act as an agent in assisting to secure a proper collection of these and other minerals used in iron-making, but it did this upon the express condition that the means necessary to prosecute the work should be forthcoming from those who were interested in seeing it done. If these means have been withheld, or if they shall yet be withheld, the responsibility for any failure to accomplish a gratuitous if not thankless task must rest where it properly belongs. It will not attach to the American Iron and Steel Association."

Translating this into still plainer English, we understand it to mean that, if persons or States intending to exhibit ores at Philadelphia, have any money to spend for that object, the Association will be glad to "assist" in spending that money. This is, however, not precisely what was offered in the famous circular of two years ago. Then it was proposed to assist in *raising* the money—a very different matter. The Secretary appealed for contributions to the members of the Association first, and to the world at large afterwards. As the members gave nothing at all, the world can scarcely be blamed for following their example. Now this entire, abject, confessed failure was due either to the officers or to the members of the American Iron and Steel Association. They may settle that question among themselves ; the public is not interested. But the public is interested in inquiring now, what earthly use there is in the offered "assistance," at the present stage of affairs, of the individuals, or the Association who bankrupted the undertaking before.

"The committee," we are told, "proposes to coöperate with all State governments which will assist in making the contemplated display of ores and fuels." This proposition appears to have had, so far, but one result—the State of Pennsylvania has been frightened out of the idea of doing anything in the premises. Other States, fortunately, have taken action, and will be quite equal to the business of expending their own funds without coöperation. We suspect that, having failed in Pennsylvania, the committe will lose heart. Coöperation in an exhibition of other States, with Pennsylvania omitted, would be too cruel a joke !

The *Bulletin* makes a rather striking use of the failure of the Pennsylvania appropriation :

"Just here we remark, for the benefit of certain persons outside of the *Iron Age* office—persons who are never in their element except when magnifying their own assumed virtues and denouncing those who do not accept them at their own valuation—that the State of Pennsylvania, whose people have been charged with blocking the way to a fair representation of the ores and coals of other States, has made absolutely *no* preparation for the display of its *own* ores and fuels. It ought long ago to have made this preparation, if only to set a good example to other States, but its Legislature has thus far refused the necessary appropriation."

In other words, the Legislature of Pennsylvania was not a party to the plan of an exclusively Pennsylvanian exhibition ; and the plan has failed. The "persons," for whose benefit the *Bulletin* overcomes its natural politeness so far as to make this remark, are probably those members of the Scientific Advisory Board who, having been solicited to give their services without remuneration, and having been subsequently treated with undeserved and undeniable disrespect, have resented such treatment in conversation and correspondence with the Secretary, and in the columns of this journal. We can assure the *Bulletin*, for one of them, that he is "never in his element" completely, except when extending and receiving the courtesy usual among gentlemen. That is also the proper element of the *Bulletin*, and its accomplished conductor. If the members of the Scientific Board have been weak enough to accept the valuation of their virtues put upon them by his famous circular, it is not from him that the denunciation of their conceit should come. Disingenuous flattery at one time is not made any better by digraceful insult at another. The wise man who recovered his eyes by jumping "into another bush," lives only in the pages of Mother Goose. He can't be found in Philadelphia.

In short, the committee is in danger of becoming both odious and ridiculous ; and in our capacity as adviser, we really cannot help suggesting that, without making any more fuss, it should decently get into its coffin. The ENGINEERING AND MINING JOURNAL will tuck it up tenderly, and with due decorum screw down the lid.

*

The Strikes in the Anthracite Regions.

We last week gave a statement of the earnings of miners in the Wyoming and Lehigh Regions, and repeated the opinion that the wages offered and still refused by the men, are not alone fair, but they are higher than can be earned in any other large industry in the country. The best friends of the miners are those who counsel them to accept the proposed reduction, and go to work, and this advice we give. It is quite true, the companies do not propose reducing the price of coal to the extent the needs of the country demand, but the question, so far as they are concerned, is likely to be solved in a manner that we have foreshadowed, viz., by the substitution of bituminous coal and coke in many industries that have heretofore used anthracite exclusively. Some years ago, during the "coal famine" caused by the strikes and lockouts in the anthracite region, many manufacturers were obliged to use bituminous coal on account of the difficulty in obtaining anthracite, and many of them have continued the use of the former though the price of the latter has since been very low ; it is therefore quite probable that those that find it desirable to change to bituminous coal at the present time, will scarcely change back to the old fuel. For steam generating, bituminous coal is at least equal, and in some cases superior, to anthracite, while for blast furnace use coke is the better fuel. An interesting article by Mr. JOHN FULTON, engineer of the Huntingdon and Broad Top Railroad, which we publish in another column, gives some suggestive figures on the relative economy of coke and anthracite at Harrisburg; with anything like the margin stated, coke could certainly come advantageously to furnaces much further East, and it will probably sensibly affect the demand for anthracite from the iron industry.

We believe the interests of the great companies would be promoted by making an important reduction in the price of anthracite, and one of the strongest points in the opposition of the men to the acceptance of a lower rate of wages would thereby be removed.

There is no doubt that the great over-supply of labor in the coal regions is a serious source of trouble, for it reduces the total earnings of the individual miner by reducing the time during which he has to work to supply the demand of the market for coal. Would it not be to the interests of both the men and the companies if the latter were to contract with so many men as may be considered necessary to produce the coal, to furnish them with steady work for say eleven months in the year, and the men on their part to be bound to work every working day during that period ? With such an arrangement the men would do much

better than at present, even if the wages were reduced 20 or 30 per cent. instead of 10 or 15. If no such arrangement as this can be adopted by the companies and men, cannot the question of wages be left to arbitration instead of settling it by the barbarous method of strikes and lockouts?

Coal Property of the Union Pacific Railroad.

WE extract the following from the Annual Report of the Board of Directors of the Union Pacific Railroad Company, for the year ending December 31, 1874:

"The Union Pacific Railroad Company own in Wyoming Territory an area of coal fields greater than the entire anthracite coal fields of the State of Pennsylvania. The coal fields of the company extend along 400 miles of the road, and five million acres of its lands are within the coal measures. The coal is superior for ordinary fuel, and unequaled for making steam and for all manufacturing purposes. It will furnish cheap fuel to the company for its own traffic, and will afford large additional revenues from the sale and transportation of coal for domestic and manufacturing uses to supply the country extending for nearly two thousand miles from Omaha to the Pacific coast. ". . .

"The control by your company of the coal supply for use of locomotives has resulted in a saving of over $100,000 during the past year over the the year preceding, in the cost of fuel, and has enabled settlers along the line of the road to obtain fuel at correspondingly reduced rates."

Easton and Amboy Railroad.—At the Musconetcong Tunnel there remains only about 300 feet of bottom to be taken out, to make the tunnel of full size the whole way through. Work on the arching, where it is needed, will then be pushed forward. The track has been extended from Neshanic northwest 18 miles to a point 2½ miles east of the tunnel, where there is a cut and fill yet unfinished. The second track has been laid from Perth Amboy nearly to Bound Brook. On the western end, the grading is finished from Phillipsburg to the tunnel, and work has been begun on the bridge over the Morris Canal at Port Delaware.

NEW PUBLICATIONS.

Rapid Transit and Terminal Freight Facilities. Report of the Committee of the Society of Civil Engineers. For sale by D. VAN NOSTRAND, New York.

This admirable report possesses a great value, as being a full and careful review of the rapid transit question. The conclusions arrived at appear well founded, and of so general an application as to make a perusal of this report of interest to many besides the citizens of New York. As a paper of the Society of Civil Engineers, it was not accessible to a large number of interested persons who are not members. Its sale by D. VAN NOSTRAND obviates this difficulty, and greatly extends its usefulness.

Van Nostrand's Eclectic Engineering Magazine for March, 1875.

This standard publication contains the usual amount of valuable reading matter. We may mention particularly E. W. HYDE's article on Skew Arches, which gives the investigation of this interesting problem by means of the higher mathemetics. A republication of ATKINSON's Ventilation of Mines, one of the best little books on the subject in the English language, will give the magazine a particular interest to many of our mining engineers.

Harper's New Monthly Magazine for April.

This number contains a very valuable and interesting paper on "The First Century of the Republic; Progress in Manufacture," by the HON. DAVID A. WELLS. It is written with that distinguished statesman's usual care and thoroughness and will well repay perusal. The Stone Age in Europe, by CHARLES RAW, will be read with interest by those interested in the subject of the antiquity of man.

BOOKS RECEIVED.

First Annual Report of the Ohio Inspector of Mines. We shall notice this fully at another time, as we shall also:

The Report of the Alabama State Geologist.

Blast Furnace Examples. No. III.

By JOHN A. CHURCH, E. M.

IN the ENGINEERING AND MINING JOURNAL some very interesting data have been published of a furnace in West Virginia, which was evidently doing excellent work. I applied for further details and obtained the following:

Height	45 feet.
Diameter of boshes	11 "
" of tunnel head	8 "

Ore: Calcined limonite	399 tons.	0·931 tons per ton pig.
Raw "	399 "	0·931 " " "
Limestone	246·1 "	0·574 " " "
Coke	449 6 "	1·050 " " "
Make of furnace during 6 weeks	428·5 "	

Blast.....1750 to 1500 cubic feet per minute.
Average number of pig..... 2·20

This run being made to test the furnace when using coke as fuel, great care was taken in weighing, so that the quantities are unusually exact. The raw ore was fine, and the calcined was lump. The coke was made from West Virginia coal. The analyses are:

	Raw Ore.	Calcined.	Limestone.	Coke.
Fe	48·08	57·42		
SiO_2	15·53	12·32	2·23	
MgO & CaO	0.92	1·05	54·47	
Al_2O_3	2·39	1·04	0·50	ash 7·70
CO_2		....	42·80	
MnO	1·72	....		
Water	10·18	1·80		
P_2O_5	0·38	0·80		

DISTRIBUTION OF THE MATERIALS.

	Tons.		Iron.	Slag.	Gas.
Calcined Ore, 0·931 tons.					
83.00 Fe_2O_3	0·773	Fe	0·480	....	....
		FeO	....	0·078	....
		O	....	....	0·215
12·32 SiO_2	0·115		....	0·055	....
		Si	0·030	....	....
		O	....	....	0·030
2·88 Bases	0·026		....	0 026	....
1·80 Water	0·017		....	....	0·017
Raw Ore, 0·931 tons.					
70·60 Fe_2O_3	0·657	Fe	0·460	....	....
....	....	O	....	....	0·197
15·53 SiO_2	0·145		....	0·145	....
3·87 Bases	0·036		....	0·036	....
10·00 Water	0·093		....	....	0·093
Flux, 0·574 tons.					
54·47 MgO & CaO	0·313		....	0·313	....
42·80 CO_2	0·245		....	....	0·245
2·23 SiO_2	0 013		....	0·013	....
0·50 Al_2O_3	0·003		....	0·003	....
Coke, (21 cwts.) 1·050 tons.					
85·00 C	0·892		0·030	....	0·862
7·70 Ash	0·081		....	0·081	....
7·30 H_2O and Volatile	0·077		....	....	0·077
			1.000	0·750	1·736
Total solids	3·486				
O in ore	0·442				
CO_2 "	0·245				

Heat Estimate.—

	Units.
Reduction of Fe_2O_3, 0·940×1887	1774
Reduction of SiO_2	210
Fusion of pig	330
Decomposition of limestone, 0·558×337·5	188
Fusion of slag, 0·750×550	413
Evaporation of water, 0·187×606·5	113
Decomposition of H_2O, .5×0·0062×3222	190
Sensible heat of gas, 6·75×250×0·239	323
Loss by radiation	400
	3941
Supplied by blast, 5 tons×344°C×0·239, Spec. Heat..	411
	3530
0·442 O in ore=0·3315 C (in CO) to CO_2	1859
	1671

This corresponds to 0·675 tons carbon. The amount really burned is 0·862 tons, as the table of distribution shows. The difference is expended in maintaining the reduction of carbonic acid. The account then stands:

	Units.
Burnt in hearth, 0·780 tons C to CO	1929
Burnt at top, 0·3315 C (in CO) to CO_2	1858
	3787
CO_2 reduction, 0·082 tons C	257
(As above)	3530

Composition of the Exit Gas.—The carbon burned in the hearth corresponds to 1·040 tons of oxygen, or 4.5 tons air, and we accordingly have in the exit gas mainly:

Nitrogen	3·465	56
Oxygen	1·655	26
Carbon	0·929	15
H_2O and volatile	0·187	3
		100

The Carbonic Acid Ratio is:

0·611 C to CO	=	1·426 CO	=	100
0·251 C to CO_2	0·921			
From limestone	0·245			
		1·166 CO_2	=	82

This furnace, therefore, is working up to the maximum economy, if the data assumed above are correct. As the analyses are all real, with only a change of 1 or 2 per cent. in the proportion of iron to adapt them to the actual make of the furnace, there remains only the coke analysis as a possible source of error. As to the composition of the coke, we only know that it contained 7·7 per cent. ash. If we alter the 85 per cent. of carbon assumed above to 90 per cent, we should have to allow 0 107 tons C for the CO_2 reduction, and the account would then stand:

0·689 C to CO		1·608 CO	=	100
0·226 C to CO_2	0·728			
Limestone	0·245	0·973 CO_2	=	60

The coke was made from West Virginia coal, burnt in pits. It seems hardly possible that the coke could have contained only 2·3 per cent. moisture and volatile matter, and the true carbonic acid ratio is probably nearer that obtained under first assumption. In any case, this furnace is doing admirable work, and the calculations here presented deserve additional confidence, from the fact that the six weeks' run which they cover was really an experimental trial, the quantities used and produced are known with unusual exactness, and the analyses are all recent.

NOTE.—A remarkable confirmation of the correctness of these calculations was

given by the answer of the furnace owner to a letter communicating these results. An exit gas containing 82 parts of carbonic acid to 100 carbonic oxide must necessarily be difficult to ignite, and so the manager found it. On some days it was impossible to burn the exit gas. It could not be lighted and hardly burned even in the hot blast oven with its walls raised to a red heat. The furnace manager had attributed this difficulty to the supposed presence of moisture in unusual proportions in the gas, but these calculations led him to the true solution—no doubt with satisfaction to himself. This report from the furnace indicates that the assumption of 85 per cent. carbon in the coke is not far from the truth, and that the second hypothesis of 90 per cent. C, assumed in order to remove what seemed to be the almost incredible working ratio of 82 carbonic acid to 100 carbonic oxide was really unnecessary, and probably incorrect.

These facts are presented with peculiar satisfaction. In GRUNER's book an example is worked out in which a French furnace is found to be doing work as good as this, but from the fact that some of the analyses are evidently assumed (the composition of pure precipitated carbonate of lime being given for the analysis of limestone) that example does not have the significance or trustworthiness of this. Here all the data are real, and from this example we may learn that it is possible to reach laboratory perfection in operations on the large scale. This West Virginia furnace offers the best example of theoretical equilibrium with which I am acquainted.

Useful Effect of the Blast Engine.—Though the dimensions of the blowing engine are not included in the data furnished, the amount of air blown is given at 1750 to 1,500 cubic feet per minute, this quantity being obtained by calculating the capacity of the engine and making the usual deductions for leakage. The average, 1,625 cubic feet per minute, corresponds to 7,312 lb. per hour, and as the make of the furnace is exactly 12 tons per day the weight of air delivered by the engine is 6.5 tons per ton of pig. We have seen above that the heat calculations show a requirement of 4.5 tons air. The useful effect of the engine therefore is

	Cubic feet.	Tons.
Air *delivered* by engine per ton	1625	6·5
Air *received* by furnace "	1108	4·5
	517	2·0

Difference 31 per cent., which is the loss over and above that allowed for as usual.

The following is the letter above referred to, received from the manager :

"I have no doubt that there was a large percentage of carbonic acid in the gas from the coke furnace ; it would not burn at the tunnel head, frequently for a whole day together, although flame was applied to it, and but sluggishly in the hot blast oven, where the walls were a bright red, but we attributed the difficulty of igniting in part to the water in the ½ raw limonite used. I believe that the coke analyzed was a very fair average sample, and that it does not contain less than 7.70 ash. The amount of ash was all that was determined, water not given. The Connelsville coke contains about ½ per cent. moisture, according to Mr. BRITTON, ash 11 per cent., and carbon 87. I should not be surprised to find the West Virginia coke contain more carbon than the Connelsville, say 90 per cent., although, as it was made in open pits and the Connelsville in ovens, the former probably contains most hydrogen. The coke is undoubtedly a very good article, as the burden of ore carried during the latter part of the trial was 17 cwt. on 8 cwt. of coke. On the other hand, I think that the constitution of the ore is favorable to reduction. The following is an analysis of the coal made in August, 1873 :

Moisture	1.46
Volatile matter	21.86
Coke	69.74
Ash	6.94
	100.00

I have just received the account of last week's work of same furnace using cold blast and charcoal, ¼ calcined ore and ¾ raw ore which may be instructive for comparison. I enclose results :

Iron made last week in August, 1874.—

No. 1.	No. 2.	No. 3.	No. 4.	Mottled.	W.	
33.10	19.10	8.10	8.10	2.0	5.0=77	tons.

	Tons.	cwt.
Charcoal used	102	2
Ore, ¼ calcined	155	4
Limestone	13	10
Furnace cinder	18	02

The charcoal was weighed into the furnace.

Blast used, 1750 cubic feet per minute, less loss at piston, etc., etc.

CORRESPONDENCE.

Duty of Pumping Engines.

TO THE EDITOR : Sir—Why does Mr. ROBERT BRIGGS find so much fault with Mr. WORTHINGTON's statement of Pumping Engines? It seems to be a very good table for those who want to get a good practical view of the subject. If Mr. BRIGGS wants to push his claims on other grounds, why does he not, leaving all statements behind him, make his comparisons with engines that meet him in his own fashion? Here are the premises for a little discussion. A year or two ago, two engines of equal capacity and of the same general principle were made—one for Lowell, the other for Lynn. Both were tested by the same Committee. Lowell gave 93 millions foot pounds duty, Lynn gave 104 millions. After working a year or two in their respective places within a few miles of each other, only that Lowell is something further inland, so that the "genial New England winter" was perhaps a trifle more "genial," the Lynn Board published the cost of raising a million gallons of water a foot high at 7.16 cents in 1874, while the Lowell Board stated their cost at 13.17 in the same year. The Lowell duty has fallen away from the trial to 58½ millions, while the corresponding duty at Lynn is 86 millions. Can he make these little matters plain on the ground of time lost? Will the difference between 2226 hours pumping at Lynn and 1921 at Lowell be enough to figure on? It seems to me that Mr. WORTHINGTON does not undertake to explain such things, but only to state facts exactly as they are. It is here where the science comes in, and just about here where Mr. BRIGGS will find somebody willing to try conclusions with him. It looks curious to me that, after belaboring the Tables, Mr. BRIGGS should make precisely the same statement over again, under the head of "Duty in pounds of water raised a foot high with 100 pounds of coal, calculated on total coal consumed making no deduction for ashes and clinkers."

FLY WHEEL.

The Increasing Use of Coke in the Metallurgy of Iron.

TO THE EDITOR : Sir—The recent movement of coke eastward, to supply furnaces on the Susquehanna and Juniata, has excited considerable attention. It was not expected that this new application would follow so swiftly the policy foreshadowed at the Philadelphia meeting of pig iron manufacturers, in November last. The disturbed condition of the anthracite coal trade has, doubtless, hastened this result.

This introduction of coke at the blast furnaces at, and adjacent, to Harrisburg, is designed mainly for an experiment to test its purity, calorific power and cost, as compared with the fuel previously used—anthracite coal.

A brief practice will manifest the fact that the density of good coke will enable it to compare favorably with anthracite coal in bearing the burden in furnace and in sustaining a high blast pressure. It is also well known that some of the purest anthracite coal, the glassy quality, with a maximum of carbon, decrepitates so much in the furnace, that it cannot be advantageously used. An analysis of the coke made and used at the Kemble furnaces, in the Broad Top Coal Region, will indicate its purity and power for furnace use.

Analyses of Broad Top and Connellsville coke and furnace anthracite coal, for comparison.

(a.) BROAD TOP COKE.		(b.) CONNELLSVILLE COKE.		(c.) FURNACE ANTHRACITE.	
Fixed Carbon	89 28	Fixed Carbon	87.456	Fixed Carbon	89 06
Ash	9 66	Ash	11.322	Ash	5.81
Sulphur	1 06	Sulphur	0.693	Volatile Matter	3.78
		Phosphorus	0.029	Moisture	1·35
	100.	Moisture	0 490		100.
			100.	Sulphur 0 300 Phosphorus 0.024	included in above.

(a.) Analysis by THOMAS J. MORRELL, Esq., Chemist, Cambria Iron and Steel Works.
(b, c.) Analyses by J. BLODGET BRITTON, Esq., Chemist, Philadelphia.

The similarity of the composition of good coke to the *best* furnace anthracite is remarkable, and although the former contains a slight excess of sulphur, the latter usually holds a larger volume of phosphorus. Hence, as to the relative purity of these fuels, very little can be said ; the practical consideration is rather one of relative cost at the furnace, and the chief element in this is *freight*, the amount of which will depend on the distance to be transported.

The Broad Top coal field contains 80 square miles of coal measures, with five workable beds of coal, and is the *most eastern semi-bituminous coal supply in the State of Pennsylvania*. It lies less than 70 miles west of Harrisburg, and by rail over the Pennsylvania and Broad Top railroads, 127 miles.

It is a very remarkable coincidence, that just as this want of a cheap fuel for furnaces is beginning to be felt, the four years of experimental work on coke in Broad Top had closed in so decided and successful a manner, *in making a first-class coke from washed coal.*

Two of the five seams of the region have been found to be peculiarly adapted to making coke :—the *Barnet* and *Kelly*. The coke used in the Kemble furnaces is from the latter seam. It is believed, however, that the coke from the Barnet seam will be somewhat denser and contain a larger volume of carbon.

Anticipating a growing demand for coke, the Huntingdon and Broad Top Railroad and Coal Company have quite recently concluded a lease with Mr. R. LANGDON, of Huntingdon, a large coal operator, renting him two of the Company's mines—Cumberland and Crawford—both working in the excellent Barnet seam. The Lessee is required, by the terms of the lease, to construct a bank of Belgian ovens for coking a large supply of washed coal, the company to construct an extensive washing apparatus for this purpose.

The introductory works have been commenced, and will be pushed to completion as rapidly as possible, so as to produce a prime quality of coke at the lowest cost, by the use of the best modern method and appliances.

The most important consideration is the relative cost of these furnace fuels at Harrisburg.

Connellsville coke is now sold there at $4 25 per ton. Taking its cost delivered in railroad cars at or near Connellsville at $1 37 per ton, net, would leave $2 88 as freight on a ton for 238 miles.

Broad Top Coal, made in Belgian ovens with improved apparatus, from best washed coal, is carefully estimated to cost as follows :

1¼ tons of coal at 90 cents	$1.12½
Washing coal	15
Coking in Belgian ovens	45
Loading on railroad cars	15½
Total	$1.88

Freight from Broad Top Coke Works to Harrisburg, 127 miles, say $1 90 per ton, net, making 1 ton of coke cost at Harrisburg $3 78.

Anthracite coal is estimated at the same place at $4 50 per ton.

The relative cost of these fuels at Harrisburg is as follows:

Broad Top coke, $3 78; Connellsville coke, $4 25; anthracite coal, $4 50.

But 1¾ tons of Broad Top coke smelt 1 ton of pig metal at the Kemble furnaces. Assuming Connellsville to be equal in calorific effect to Broad Top, and taking the average of anthracite coal for the same work as two tons, the cost of smelting 1 *ton* of pig iron with each kind of fuel will be:

Broad Top coke, $6 61½; Connellsville coke, $7 43¾; Anthracite coal, $9.

If a furnace produces 200 tons of pig iron per week, the cost and relative economy of the above fuels will appear as below:

Broad Top coke	200 tons	× $6.61½	= $1,323.00
Connellsville coke	200 "	× 7.43¾	= 1,487.50
Anthracite coal	200 "	× 9.00	= 1,800.00

Weekly saving of Broad Top coke over Connellsville, $164·50; yearly, $8,554.00!

Weekly saving of Broad Top coke over anthracite coal, $477.00; yearly, $24,804 00!!

The *purity* and power of Broad Top coke have been so thoroughly tested at the Kemble furnaces that no further discussion is required. With this superior furnace fuel the Kemble Company is making pig iron that is now being used in the manufacture of boiler plates!

The metal under accurate test bears a tensile strain of 52,000 pounds per square inch of cross section, exhibiting also a remarkable elasticity before breaking.

It has been intimated that the coke trade would be wrecked by a reduction in the price of anthracite coal. This does not appear reasonable, for a reduction in the zone where furnaces can be supplied by coke would induce a similar reduction outside, balancing the gain on the one hand by the loss on the other.

Independent of all this, the law of right application is being unfolded. Anthracite coal, with its constantly increasing circle of demand for domestic use, is gradually flowing into the channels manifestly destined for it, and the coke gravitating to its destined work in the great furnace operations.

The anthracite supply is drawn from three small basins, whose aggregate area is only 472 square miles, whilst the coke flows from the great Appalachian Field, whose area in Pennsylvania alone is over 12,000 square miles.

There should be no discord in the adjustment of the fuel supply. Why furnace-men hesitate in taking a decided interest in this new movement is very singular. In place of controlling, measurably, this fuel question, they seem to be hesitating between two sources of supply, one of which must advance in price, and the other, undirected, will gradually follow.

Furnace-men should therefore make such purchases of the best coal lands as would enable them, for an age to come, to obtain a cheap supply.

And as coke is rapidly working out its destined place of usefulness in the metallurgy of iron, and as its cost is the chief question, especially to eastern furnace-men, its freight would be reduced by slack-watering the Juniata to Huntingdon, thus opening a cheap freight channel to the furnaces, and developing a trade that would insure a large and ever-increasing amount of tonnage.

JOHN FULTON, Mining Engineer.

SAXTON, PA., March 20, 1875.

Sparks from Copper and Bronze.

COPPER TAMPING BARS.

THE following information will doubtless explain the cause of many of the explosions of blasts, which occur in mines even while tamping with copper tamping bars, which we have been in the habit of considering perfectly safe.

A number of experiments to determine the comparative liability of copper, ordinary bronze (gun-metal), and phosphor-bronze to emit sparks when subjected to sharp friction or percussion, have recently been carried out in one of the workshops of the Royal Gunpowder Factory, Waltham Abbey. These experiments were conducted after dark on the evening of the 26th October, 1874, in the presence of Colonel YOUNGHUSBAND, Major MAJENDIE, Major MORGAN, and others, but have been published only recently.

During each experiment the gas was extinguished, leaving the room in total darkness, so that the least spark could be readily distinguished. The numerals distinguishing the different samples of phosphor-bronze experimented with indicate different alloys, No. 2 being the softest and No. 8 the hardest, and the results are recorded exactly as they were noted down after each experiment.

The results obtained show that copper, gun-metal, and phosphor-bronze are all liable to emit sparks, or, as it is commonly called, "strike fire," when subjected to a certain description and degree of friction, the degree of liability appearing to vary with the different alloys and frictional surfaces, and, to some extent, with the construction and consequent rigidity of the article employed. So far as they went, these experiments appeared to indicate that the harder descriptions of phosphor-bronze emit sparks less readily than the softer samples, and less readily than ordinary bronze or even than copper. The negative results obtained in series B and C can hardly be safely accepted as conclusively establishing the absolute non-liability of the various metals employed to "strike fire" under the conditions described. With a slight variation of those conditions it is not impossible that sparks would be obtained.

The real value of these experiments consists in the positive evidence which they furnish as to the somewhat unexpected readiness with which, under certain conditions, sparks, and even a stream of sparks, more or less intense and continuous, may be obtained by friction from such metals as copper, gun-metal, and phosphor-bronze. This result can hardly fail to possess a practical interest for manufacturers of gunpowder and other explosives, and for persons who are called upon to deal with, and handle, these substances. At the same time, these experiments, as might have been anticipated, bear ample testimony to the very great superiority of copper, gun-metal and phosphor-bronze to iron and steel in regard to the liability to "strike fire."

In series A, a "free grit" stone, of the same description as is used for sharpening small tools and razors, 6 inches diameter, revolving 1220 revolutions per minute, traveling 2079 feet per minute, was supplied for these experiments, the material experimented with being in each case applied firmly to the revolving stone and held against it for about half a minute. The first experiment was with No. 2 phosphor-bronze, which occasioned sparks, and sometimes a stream of them. In experiment 2 on No. 2 phosphor-bronze, the sparks amounted to a small feeble continuous stream. In experiment 3, on a thin gun-metal knife it gave a few sparks, but no continuous stream, and nothing like No. 2. In experiment 4, on a gun-metal lever of stouter section and altogether harder than the knife, there were numerous sparks and at times a slight stream, but not quite so bad as in No. 2. In experiment 5, on gun-metal ingot, for making bolts, &c., good casting, there were a few sparks, but chiefly a continuous feeble stream, but only the cast surface was applied (see No. 10). In experiment 6, on gun-metal ingot, for making bolts, &c., but a rotten casting, there was a considerable uninterrupted stream of sparks quite as bad as in No. 2. In experiment 7 on No. 2 phosphor-bronze, a feeble stream was at first obtained but not so bad as No. 6. In experiment 8, being No. 7 repeated, one or two faint sparks only were obtained. In experiment 9, being No. 6, repeated, a continuous and lively stream of sparks was obtained, it being the worst result up to this point. In experiment 10, being No. 5 repeated, but applied only to the strictly metallic surface, there was a strong stream of sparks, occasionally interrupted, but generally continuous. This was about as bad as No. 9. In experiment 11, on No. 4 phosphor-bronze, some very strong sparks were obtained, and at times almost a succession, but generally rather of the nature of a prolonged spark. In experiment 12, on No. 7 phosphor-bronze, one or two strong sparks were obtained, but no indication of a continuous stream, in fact less than in No. 11. (This is the alloy usually employed for the tools and fittings of gunpowder works where phosphor-bronze is used.) In experiment 13, on No. 8, phosphor-bronze, so hard that it can be used to chisel hard beech, only one faint spark was obtained. In experiment 14, on gun-metal ingot, the same as employed in No. 10, a considerable succession of sparks was obtained, but not quite so bad as in No. 10. In experiment 15, on copper sheet, about ⅛ inch thick, for press plates &c., an intermittent stream of small sparks was obtained. In experiment 16, on gun-metal casting, for the edge of a press plate, three sparks were obtained. In experiment 17, on a wrought-iron rod, a bright continuous stream of fire was obtained, and the sparks flew 6 inches or more in some cases. The light was very bright and intense. In experiment 18, on hardened steel, being a file, there were brilliant corruscations.

In the Series B, a cast-iron cylinder 6 inches in diameter, and revolving at 1220 revolutions a minute, was substituted for the "free grit" stone. In the first three experiments on Nos. 2, 7, and 8 of phosphor-bronze, there were no sparks. In experiment 4 on a gun metal ingot, there were no sparks. In experiment 5, on a copper sheet, ⅛ inch thick, there were no sparks. In experiment 6, on a wrought-iron rod, there was a brilliant stream of fire. In experiment 7, on hardened steel, there was a brilliant and rapid flow of sparks. In Series C, a gun-metal cylinder 8 inches in diameter, and revolving at 1625 revolutions per minute, was substituted for the iron cylinder. In all the experiments, seven in number, conducted on Nos. 2, 7, and 8 phosphor-bronze, on a gun-metal ingot, a copper sheet, wrought iron, and steel, there were no sparks.

To the above, as equally interesting, may be added a table, recently issued by the Phosphor-Bronze Company, showing the results obtained with experiments on axle bearings in Germany, and published in the *Politechnishes Centralblatt*, of January 1.

Kind of Bearing.	Composition in 100 parts Alloy.	Comparative cost of 100 Kilos Bearings inclusive of Melting expenses, loss, etc.	1 Kilo. Bearing Metal Runs.			Cost of Bearing Metal per Waggon with 4 Bearings per 100 Kilometres,	Names of Railroads where Used.
			German miles.	Kilometres.	Wear per 1000 Kilometres for 4 Bearings.		
		marks			grms.	s. gr	
Gun Metal	83 copper, 17 tin,	260·2	12,052	90,390	11.60	0.301	Austrian Railway.
" "	82 copper, 18 tin,	260.8	13,320	99 900	10.01	0.260	Grand Central Belge.
White Metal	3 copper, 90 tin, 7 antimony,	298.68	9,104	78,280	14.64	0.395	Austrian Railway.
" "	5 copper, 85 tin, 10 antimony,	293.40	11,750	88,145	11.35	0.331	Niederschlesisch-Märkische Bahn.
Lead Composition	84 lead, 16 antimony,	118.56	10,338	81,280	12.30	0.145	Austrian Railway.
Phosphor-Bronze.	.....	350.8	57,226	429,200	2.33	0.081	Grand Central Belge.
Gun Metal on brake cars	82 copper, 18 tin,	260.08	1,218	9,134	109.48	2.844	" " "
Phosphor-Bronze on brake cars	.....	350,00	14,320	107,410	9.31	0.325	" " "

—*Iron.*

American Method of Treating by Distillation the Zinc-Silver-Lead Alloy, Obtained in the Desilverization of Lead.

CONTINUED FROM PAGE 203.

resulting from badly-refined, especially from cupriferous, work-lead, requires naturally a much longer time. The former leaves, after tapping, scarcely any residue but charcoal in the retorts; the latter leaves a considerable quantity of dross. It is, therefore, policy to refine the lead as completely as possible before adding the zinc, even if there is so little dross in the work-lead, as received from the shaft-furnaces, that it would apparently not pay to subject it to a refining

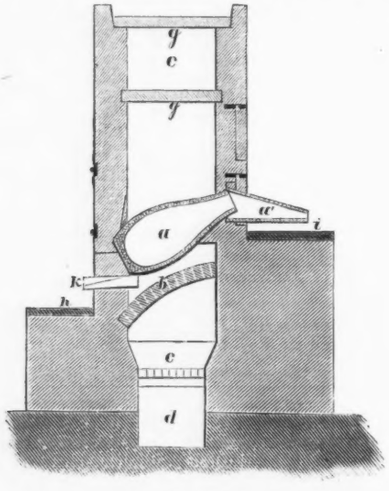

Fig. 10.

before the addition of zinc. The quantity of fuel used in this furnace is 2240 lb. of soft coal per ton of zinc-crust. One man attends with ease to the six retorts. The product of silver and zinc is not different from that obtained in the

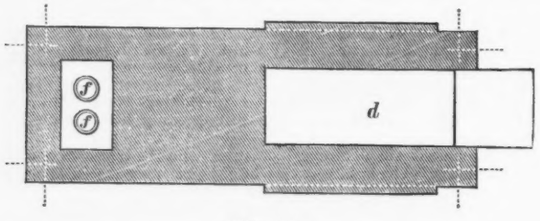

Fig. 11.

Faber du Faur furnace; but the time required to finish an operation is far longer in this case. But, perhaps, this may be remedied by a larger grate-surface, and by having the retorts made in the future with a prolongation in the bottom, the object being to render possible such a position of the retorts in the furnace, that the flame can play around every part of it which contains metal.

Construction of Foundries.*

By Mr. J. M. OUBRIDGE, Middlesborough.

EVER since the late JOHN VAUGHAN commenced to utilize the Cleveland ironstone, everything that brains and money could command has been employed to improve the blast-furnace and the rolling mill. Metallurgical science has been made to disclose its principles so clearly that results are uniformly and almost invariably obtained, and engineering art has invented and constructed "plant," which mechanically insures successful operations. But another, and that an important branch of the iron industry of this district, has been comparatively neglected—I refer to the iron foundry. This has not been made a specialty of the district, as it might have been. With the exception of pipes and railway chairs, founding has not been made a staple article with us. A few exceptions, for local purposes only, prove what might have been the rule.

With such an abundant store of iron ore under our feet, with so much coal, and other manufacturing material, within easy distance of our works, with so accessible a land and water carriage at our very door, I see no valid reason why we should not be the greatest ironfounders in the world. No doubt we can command the skill to execute contracts of any kind, and to any extent; no doubt we could make this district as celebrated for iron casting as it is for iron smelting or for rolling iron rails; but to accomplish this, more enterprise is wanted in the construction of our foundries. It is not enough to have plenty of land for the construction of works, plenty of raw material to cast from, and ready means of land and water carriage; we must have our foundries planned so as to produce the greatest quantity of castings at the least possible cost, keeping a vigilant eye, of course, on the quality of work turned out. From all I have seen I am convinced that we have not given sufficient attention to the proper construction of our foundries, either as regards the building, the mechanical appliances, the construction of the cupolas, and the drying stoves, the application of machine moulding, the internal and external arrangement of the "works," and also due encouragement to those who suggest better modes of developing the work.

In the construction, it is one of the greatest mistakes possible to suppose that if you get the shell of the building up you have provided adequate space for founding operations. There is the ground required for the storage of coke, iron, sand, coal etc., with easy means of depositing the same, and ready means of obtaining the same when wanted. There is the adequate accommodation for storing moulding boxes, loam plates, and other kinds of foundry plant, which are so frequently brought into use, laid aside, and brought into use again. There is the economical disposal of used material and other kinds of rubbish. All these points should be consulted from the very outset. Then comes the arranging of the internal space of your building to the greatest advantage—the proper position of the drying stoves, cupolas, loam houses, sand-mixing houses, sheds for the storage of blacking, coal dust, etc., all so arranged as to give the largest space possible for moulding ground, the loam and the sand moulding being kept so apart, that the one may not interfere with the other.

Another important element for consideration is the having easy means of ingress and egress on all sides of the building, if possible. In laying down the plant of blast-furnace or rolling mill, how much care is taken in this very particular, it being made a prime consideration to have easy access to all the parts. But, generally, you find a foundry thrust into some obscure corner, or some odd side-place of a "Works," with perhaps a single doorway into it, so placed, that you can only with the greatest difficulty get the material in and out. Again, the places where the unused plant is kept, are generally at such a distance as greatly to inconvenience the economy of the operation, and the same may be said of the space devoted to the stripping and cleaning of the castings, especially of the larger ones. Hitherto all seems to have been arranged by the rule of thumb, or by those whose science of construction has not embraced the knowledge of practical foundry detail, or foundry requisites.

In laying down the plan for the building, the block system is adopted, the same in principle at that designed by Sir JOSEPH PAXTON for the great Exhibition of 1851. A certain central space is fixed upon, and similar spaces aggregated round that central one, to any extent required, thus avoiding the appearance which such places generally present, of being mere patches. By this plan, every addition is complete in itself, and does not present the appearance of a mere make-shift place. I have purposely drawn a very large foundry, 400 feet long, and 210 feet wide, comprising under a double roof all that I think should belong to a foundry proper. The columns for supporting the principal portions of the roof, and carrying both the over-head steam travelling-cranes, and the auxiliary swing cranes, are continued forward out of the foundry end, so that all heavy material can be at once deposited in the yard direct from the moulding and casting ground. The columns are also used for the swing cranes, thus doing the light work whilst the steam travellers do the heavy.

I purpose having comparatively low walls for such a high foundry, using the space between the columns and inner walls for lighter kinds of work, as it is not convenient to have light and heavy work mixed together. The outer wall being the limit of the building, I use the intervening spaces for drying stoves, loam mills, engine and boiler-houses, and store-sheds. The stoves are placed at each corner of the building. The cupolas are so situate that the steam travelling-cranes can take the melted iron away direct from them to any part of the casting ground.

According to this arrangement of a foundry, each department of moulding is carried on in a separate part of the building, and yet all is brought under the eye of the foreman, who can tell at a glance how things are going on.

Thus far I have given a general outline of my idea how to construct a foundry. I now come to details, and allow me to say that these may mar the effect of a thoroughly good design. The proper construction of the drying stoves is of great importance, both as regards their heating power, and economy of fuel. After a long experience of drying stoves in various parts of the country, fired some with coal, and some, as here with, coke, I have settled down into the approval of, and would strongly reccommend, the plan here laid down. With me, it is no mere theory, but a realized fact, for within the last three years I have had three erected of this sort, two of them very large, and the third somewhat smaller. These have given the highest satisfaction to the firm I am connected with.

In a foundry, it is of the greatest importance to have good crane power. Let your building be ever so well arranged, if you are deficient in crane power, your casting capacity cannot be turned to efficient account. Now, having had, during an experience of some forty years, an acquaintance with almost every kind of crane, and having in that time turned out all kinds and sizes of work, I have had many opportunities of noting their defects and excellencies. In this, as in other things, we learn more perhaps from our failures than our successes. Take the jib crane as used for general heavy work. I don't like it. It is too limited in its range, and occupies too much valuable space. Steam power, directly applied, is better; or else hydraulic power; and overhead travelling cranes are much more convenient and handy than the jib. Where there is much heavy work done steam power is almost a necessity. To work 30 and 40 ton cranes by hand is folly; even in small foundries overhead cranes are much more convenient, and are found equal to all requirements.

I desire specially to call your attention to what I consider to be the best

* Read at the Cleveland Institution of Engineers.

method of applying steam power to overhead travelling cranes. There are three distinct ways in which overhead travelling cranes are worked by steam power. First, they may be worked by shifting from a fixed engine. The power in them is conveyed by bevel gearing to the machinery of the crane. From want of means to vary the speed, this mode is quite unfit to meet the requirements of a foundry. The second mode is where an endless rope is used, driven at a high velocity by a fixed engine, through friction sheaves, which vary the motions of the crane. The use of the Fowler clip drum makes a very advantageous form of this method. These two types of cranes have various modifications of detail, but they all fail in my opinion in one respect—they have not the capability of varying the power and speed. The third mode is the one to which I would specially call your attention—and that is, to have the steam power, both engine and boilers, fixed upon the crane itself, and applied direct. Some eight or nine years ago, having entered upon the charge of the Fairbairn Engineering Company's foundry, at Manchester, I found myself saddled with two very inefficient overhead travelling cranes. I advised the adoption of direct steam power cranes. The advice was followed, and never repented of, for not only were two steam cranes constructed at the time by Messrs. ELLIS, of Salford, but several more have been made since. I venture to say they are the most efficient foundry cranes to be found anywhere. They command any degree of speed required, stop or reverse any motion, and that without stopping or retarding other motions still going on—a desideratum absolutely required in a thoroughgoing foundry. I may say that I have found it prudent to have the travelling wheels made of steel, or hooped with steel tires. As I am talking of the application of steam power, I may as well say, before closing, that I would prefer having a small engine for each of the loam mills, as well as for the fans or blowers of each of the cupolas.

I now come to speak of the cupolas. Whilst the best attention has been paid to the blast-furnaces to make them scientifically and mechanically complete, the foundry cupolas remain such as they were twenty or thirty years ago. True —some slight exceptional modifications have been attempted, but have they ever been made the subject of regular scientific inquiry? What do we know of the proportion of their construction, or of the laws by which the melting of the iron is governed? Founders notoriously act empirically, and what I would now urge is, that masters should avail themselves of the experience of practical men, and bring the operations of melting and casting more under the laws of metallurgical chemistry. The size and form of the cupola, the proportionate area of furnace and tuyeres, the pressure of blast and its delivery by a fan or a Root's blower, the quantity of fuel supplied, and its adequate conversion into heat, the utilization of the waste heat etc., are all subjects which require the most careful consideration.

I do not pretend to be able to enter into such consideration. All I mean to do is to give you the result of my own practical observation, and chiefly with regard to the following points: the area of the zone of fusion, the area of the tuyeres, and the pressure of blast. In my note book I have the results from three cupolas, which I constructed for Messrs. J. SIMPSON & Co., Pimlico. The area of each was five superficial feet at the zone of fusion, with tuyeres of seven inches diameter each. They were 11 feet high to the charging door, and the height from one tap hole to the tuyere pipes was 1 foot 8 inches. A Lloyd's fan of 30 inches diameter, making 1600 revolutions per minute, gave a pressure of 11 inches of water column, when all the three cupolas were at work with the nine 7-inch tuyeres open. The duty performed was four tons of iron melted per hour, per cupola, with the consumption of eight cwt. of best Newcastle coke. Then for every foot area 3 lb. of coke were consumed per minute, and 30 lb. of iron melted, and it required 30 inches area of tuyere pipe to supply air at that pressure to consume 3lb. of coke per minute. I tried other proportions of areas and pressure, but failed to get such satisfactory results. These I found to be the best.

Of course, there are other points to take into consideration in the construction of a cupola. It is very important, for instance, to have them quite circular and free from all inequalities caused either by the burning away, or careless repairing, of the lining, by which the cupola is in danger of scaffolding, causing waste of fuel, and failure in duty. The common run of men engaged to manage a cupola, do not sufficiently understand the importance of constantly keeping a body of incandescent fuel before the tuyeres, so that the reducing gases may be generated at the lowest possible point. Perhaps it would be too much to expect from such a man a knowledge of the action of gases inside of a cupola furnace. I should like to call your attention to the drop-bottom plan of constructing cupolas. By it the refuse in the furnace delivers itself, instead of being raked out by hand. It has many other obvious advantages. There is no danger of bad bottoms, and it keeps the inside in a much better condition, access to which is much more convenient and ready for repairing, etc. I do not believe that any one who adopts the drop-bottom system will ever go back to the old style.

Another important point I must notice, is to keep the conduct from the fans or blowers uniform, avoiding great chamber spaces, as brick culverts and abrupt turns. Many a good fan has been condemned for faults not its own in this respect. I prefer cast iron pipes of the same area as the outlet of the fan. When bends are unavoidable, the radius of the bend should be as large as possible.

I am also an advocate of close-topped cupolas, charged through a hopper. I cannot see but that what is good for the blast-furnace is also good for the cupola furnace. We have only to raise the height, increase the pressure of the blast, using a Root's blower instead of a fan, and heat the blast from the waste gases to do duty more effectively, and at the same time save a considerable amount of fuel. I may add that after the waste heat has done duty in heating the blast, it might be finally turned over to getting up steam in a Howard's boiler, which after two years' experience of it, I can strongly recommend for foundry use.

Before I conclude, I should like to draw attention to the importance of introducing more machine moulding into this district. This can only be done by making specialities of certain kinds of work. I would also draw the attention of employers of labor to encourage, more than they do, intelligent foremen who may suggest improvements. Many a good thing has fallen to the ground for want of this encouragement, which might have not only advanced the manufacture, but materially benefited the manufacturer.—*Iron*, February 27, 1875.

Notes.

IT is proposed to make the tidal movements in the British Channel available for compressing air to drive the engines used in excavating the Anglo-French Tunnel under the Straits of Dover.

Production of Iron in France, 1874.—In 1874, France produced 1,360,000 tons pig iron, 760,000 tons wrought iron, and 155,500 tons steel.

The longest Blast of a Charcoal Furnace.—The Shelby Iron Company of Alabama blew out its No. 1 furnace on the 15th December, 1874, after having made an uninterrupted run of 3 years 9 months 15 days.

The Berlin Academy of Sciences has voted money for the purpose of maintaining in that city a number of scientific men, whose only occupation will be the investigation of science, and who will have no other duties to attend to, such as teaching, lecturing, and the like. Prof. KIRCHHOFF has received and accepted a "call" from the Academy.

A Mine Cave.—About twelve o'clock, Monday night, March 22d, by a caving of the earth at Baltimore mine No. 3, twenty coal cars belonging to the Lehigh and Susquehanna railroad, sixteen of which were loaded with coal standing on the switch, went down. The excavation made is about thirteen yards square. The depth of the hole looks to be about forty feet. The cars cannot be seen, and it is supposed they are a total wreck.

Reading and Lehigh Railroad.—This road has been leased to the Philadelphia & Reading Company for a term of 99 years, but the terms of the lease are not made public. They will probably be announced when the lease is submitted to the stockholders for ratification. The road, formerly known as the Berks County, is 44 miles long, from Reading, Pa., northward to the Lehigh Valley at Slatington. It was intended as an extension of the Wilmington & Reading and also to bring Lehigh coal to Reading in competition with the Philadelphia & Reading. The original company became bankrupt and the road was sold at sheriff's sale a few months since and bought in by the creditors, who organized a new company. The road will be known hereafter as the Berks & Lehigh Branch of the Philadelphia & Reading Railroad, that company having taken possession.

Composition of the Native Alloy of Gold and Silver in the Comstock Lode, Nevada.—Mr. MELVILLE ATTWOOD, of San Francisco, in a communication to the Microscopical Society in April, 1874, describes the pale yellow alloy from the Comstock lode as occurring in similar form and composition throughout the whole length of the lode and from the croppings down to the bottom of the deepest workings. It is found occasionally in coarse pieces, but in general is finely disseminated and intimately mixed with the silver ore. It exhibits imperfect octahedral crystals and is found also in arborescent filiform masses. Hardness 3; specific gravity 12.5; after melting, 13.5 to 13.7. Color white, with a slightly yellowish tinge when freshly broken, but becomes more yellow on exposure for some time. Analysis yielded Mr. ATTWOOD 55.37 per cent. of gold, 42.87 of silver and 1.74 per cent. of substances undetermined.

W. P. B.

Reproduction of Burnt Records.—M. RATHELOT, an officer of the Paris law courts, has succeeded, in an ingenious manner, in transcribing a number of the registers which were burnt during the Commune. These registers had remained so long in the fire that each of them seemed to have become an homogeneous block, more like a slab of charcoal than anything else, and, when an attempt was made to detach a leaf, it fell away into powder. Many scientific men had examined these unpromising black blocks, when M. RATHELOT hit upon the following method of operation: In the first place, he cut off the back of the book, so as to leave nothing but a mass of leaves, which the fire had caused to adhere to each other. He then steeped the book in water, and afterward exposed it, all wet as it was, to the heat at the mouth of a *calorifère;* the water, as it evaporated, raised the leaves, one by one, and they could be separated, but with extraordinary precautions. Each sheet was then deciphered, and the copy certified by a legal officer. In this way the records of nearly 70,000 official acts have been saved. The appearance of the pages was very curious—the writing appeared of a dull black, while the paper was of a lustrous black, something like velvet decorations on a black-satin ground, so that the entries were not difficult to read.

The Stayton Quicksilver Mines.—These valuable mines were sold a few months ago to English Capitalists for $200,000. They are situated in the Coast Range mountains between the counties of San Benito and Merced, Cal. The satisfactory results of the development of the mines are very encouraging, and when the works are enlarged this source of supply will probably sensibly affect the price of quicksilver. ROBERT STAYTON is still retained as Superintendent, and the work under his personal supervision has been progressing all winter, with the most satisfactory results. One shaft of the Cold Spring lead, says the Hollister *Enterprise*, is down 102 feet, disclosing an immense bed of rich cinnabar. On the Pacific lead the shaft is 92 feet deep, exposing a four-foot vein of rich metal. A small furnace with less than a half ton capacity has been in operation for some time, and the average yield of the ore has been ten per cent. With these limited facilities for retorting, the mines have paid all expenses, including wages of twenty hands, mining implements, material, fuel, etc., and left a margin sufficient to pay one per cent. per month on the sum paid for the property. Indeed, it is believed that there is metal enough in sight on the dumps to pay the $200,000 without touching the unmined ore at all. From the products of this small furnace some idea can be formed of the capacity of the

mines for producing wealth when the larger works of the company are put in operation.

Sonorous Sand.—There was recently presented to the California Academy of Sciences, by W. R. FRINK, of Honolulu, a specimen of "sonorous sand" from the island of Kauai, one of the Hawaiian group. In a letter accompanying the specimen, Mr. FRINK states that the bank from which this sand was taken commences at a perpendicular bluff at the southwest end of the island, and extends a mile and a half almost due south, parallel with the beach which is about 100 yards distant from the sand bank. The latter is about sixty feet high, and is constantly extending to the south. At the extreme south end, and for half a mile north, if you slap two handfuls of the sand together, a sound is produced like the hooting of an owl. If a person kneels on the steep incline, and then, with the two hands extended and grasping as much sand as possible, slides rapidly down, carrying all the sand he can, the sound accumulates till it is like distant thunder. "But the greatest sound we produced," says Mr. FRINK, "was by having one native lie upon his belly, and another take him by the feet and drag him rapidly down the incline. With this experiment the sound was terrific, and could have been heard many hundred yards away." The sand of Jebel Nagus, a hill lying to the west of the mountain usually called Sinai, in Arabia, possesses similar properties. According to Captain H. S. PALMER, an English traveler, it gives out musical sounds whenever it is set in motion. The sound produced "is neither metallic nor vibratory. It might be compared to the sharpest notes of the Æolian harp, or to the sound caused by forcibly drawing a cork over wet glass. When at the maximum intensity it may be heard at a considerable distance." Dr. JAMES BLAKE, of the California Academy of Sciences, has investigated with the microscope the structure of the Kauai sand, and states that the grains are chiefly composed of coral, and apparently calcareous sponges. They are all more or less perforated with small holes, mostly terminating in blind cavities, which are frequently enlarged in the interior, communicating with the surface by a small opening. The structure of the grains, Dr. BLAKE thinks, fully explains the reason why sounds are emitted when they are set in motion. The mutual friction causes vibrations in their substance, and consequently in the sides of the cavities; and, these vibrations being communicated to the air in the cavities, the result is sound. There are, in fact, millions upon millions of resonant cavities, each giving out a sound which may well acquire a great volume, and even resemble a peal of thunder. The sand must be dry, however, in order to produce sound; for, when the cavities are filled with water, the grains are incapable of originating vibrations.

Economizing the Heat of Waste Steam.—Mr. SPENCE lately exhibited in London his plan for the employment of waste steam as a substitute for fuel. This method is founded on a discovery made by the father of the inventor, and announced by him to the British Association in 1869, viz, that steam liberated at atmospheric pressure, and passed into a saline solution having a boiling temperature higher than that of water, raises the solution to its own boiling-point. Thus, as Mr. SPENCE showed experimentally, if we take a nitrate-of-soda solution, which boils at 250°, and blow into it steam at 212°, the temperature of the solution will be raised to 250°, the steam condensing and yielding its heat. Mr. SPENCE uses the solution of caustic soda, both on account of its high boiling-point, and because it does not act injuriously upon iron. The exhaust steam will raise this solution to a temperature of 375°, and the heated solution is then circulated through pipes in an ordinary boiler, and its heat is radiated, for the purpose of generating steam in the place of heat derived from fresh fuel. If the boiler is at a pressure of 30 lb., the solution will leave it at a temperature of 250°, so that 125 degrees of heat would have been yielded to the water. The solution having been, to some extent, diluted by the condensation of the exhaust steam, its capacity for heat will be correspondingly reduced; and, if steam at 212° were again blown through it, it would not reach the same temperature as before. It is therefore passed into another boiler of ordinary construction, where it takes the place of water, and is concentrated by steam being generated from it; and in this way its capacity for receiving heat is restored. Mr. SPENCE maintained that, if, by taking advantage of his father's discovery, a mode of utilizing the large amount of latent heat contained in the steam now thrown into the atmosphere could be brought into practical operation, so that this latent heat could be made to do actual work, the discovery would be one of enormous value, and he announced his intention of speedily trying the experiment on a manufacturing scale.

COAL TRADE REVIEW.

Import Duty on Coal.

Anthracite free. *Bituminous*, per ton of 28 bushels, 80 lb. to the bushel, 75c., gold.

All *slack*, or *culm*, such as will pass through a half-inch screen, per ton of 28 bushels, 80 lb. per bushel, 40c., gold.

Not otherwise provided for, per ton, 40c. gold.

This is the only report published that gives full and accurate returns of the production of our Anthracite mines.

NEW YORK, March 27, 1875.

Comparative Statement of the Production of Anthracite Coal for the week ending March 20:

	1875.		1874.	
	Week.	Year.*	Week.	Year.
Wyoming Region.				
D. and H. Canal Co	40,732	543,047	45,714	441,511
D. L. and W. RR. Co	54,575	485,397	40,927	459,703
Penn. Coal Co.	8,301	226,250	18,856	225,707
L. V. RR. Co.	7,604	219,080	18,091	197,723
P. and N. Y. RR. Co.	1,070	3,785	848	10,034
C. Rit. of N. J.	6,962	46,312	21,407	187,625
Penn. Canal	..	..	..	..
Lack. and B. RR.	..	28,696	..	28,831
	119,044	1,552 567	145,843	1,551,134
Lehigh Region.				
L. V. RR. Co	2,675	96,903	54,512	551,033
C. RR. of N. J.	728	5,030	8,508	105,943
D. H. and W. B. RR.	1,172	5,691	..	9,417
	4,575	107,624	63,060	666,393
Schuylkill Region				
P. and R. R. RR. Co.	29 791	195,894	107,262	623,990
Shamokin and Lykens Val.	10,802	119 756	9,645	91,148
	40,593	315,650	116,907	695,138
Sullivan Region.				
Sul. and Erie RR. Co.	265	2,735	295	4,825
Total	170,477	1,378,576	326,105	2,917,490
Increase	..	..	..	..
Decrease	155,628	938,914	..	..

* Year beginning January 1st.

The above table does not include the amount of coal consumed and sold at the mines, which is about five per cent. of the whole production.

The following table does not give the entire production of our bituminous mines, but it is by far the fullest report published.

The Production of Bituminous Coal for the week ending March 20, was as follows:

Tons of 2000 lb., except where otherwise designated.

	Week. Tons.	Year. Tons.
Cumberland Region, Md.		
Tons of 2240 lb.	28,990	222,826
Barclay Region, Pa.		
Barclay R.R. tons of 2240 lb.	4,729	91,993
Broad Top Region, Pa.		
Huntingdon & Broad Top R.R.	5,668	37,690
East Broad Top	951	5,407
Clearfield, Region, Pa.		
Snow Shoe	1 290	14,818
Tyrone and Clearfield	18,498	143,022
Allegheny Region, Pa.		
Pennsylvania R.R.	2,669	35,940
Pittsburgh Region, Pa.		
West Penn. R.R.	2,955	36,447
Southwest Penn. R.R.	104	1,177
Penn. and Westmoreland gas coal, Pa. RR.	3,296	134,246
Pennsylvania R.R.	6,028	49,807
Kanawha Region, W. Va.		
Chesapeake and Ohio R.R.	3,325	22,852

The Production of Coke for the week ending March 14.

Tons of 2000 lb.

	Week. Tons.	Year. Tons.
Tyrone and Clearfield	..	221
Alleghany Region	..	30
West Penn. R.R.	1,126	10,797
Southwest Penn. R.R.	10,142	89,442
Gas Coal, Penn. R.R.	200	7,256
Pittsburgh Coal, Penn. R.R.	1,932	15,312

Production of Bituminous Coal, 1875.

Tons of 2000 lb.	Jan.		
Blossburgh Region	19,039	..	..
Barclay Region	28,605	..	..
McIntyre Coal Co.	5,911	..	..
Broad-Top Region	11,107	..	..
Cumberland Region	87,579	..	..
East Broad Top	1,790	..	..
Snow Shoe	6,277	..	..
Clearfield Region	47,453	..	..
Alleghany Region	14 887	..	..
Pittsburgh Region.			
West Penn. RR.	16,055	..	..
Southwest Penn. RR.	413	..	..
Gas Coal, Penn. RR.	61,893	..	..
Pittsburgh Coal, Penn. RR.	22,172	..	..
Saw Mill Run RR.	287	..	..
Cleveland and Pittsburgh RR	22 882	..	..
Pittsburgh, Cincinnati and St. Louis R'd	50,598	..	..
Erie and Pittsburgh RR.	11,998	..	..
Pittsburgh, Fort Wayne and Chicago RR.	13,718	..	..
Castle Shannon RR.	7,998	..	..
A. V. & P. R.R.	242	..	..
Pittsburgh and Connellsville R	..	..	..
Monongahela Nav. Co.	..	..	..
Keeling & Co	.	..	..
Weltenaal & Gormley	1,961	..	..
J. W. Carlin & Co.	..	..	..
Pittsburgh va. & C. R.R.	2,346	..	..
St. Louis Region.			
St. L. A. & T. H. R. R. Belleville Branch	..	..	..
B. & S. I. R.R.	..	..	..
Illinois and St. Louis	..	..	..
Indiana North and South RR.	264	..	..
Evansville & Crawfordsville RR	2,265	..	..
Ohio & Mississippi RR.	..	..	..
Shawnee Region.			
Tenn. Coal & R.R. Co.	8,745	..	..
Kanawha Region.			
Chesapeake and Ohio RR.	7,947	..	..
Warrior Region, Ala.			
South and North Alabama RR.	..	..	..
Cahaba Region, Ala.			
South and North Alabama RR.	..	..	..
S. R. & D. R.R.	1,257	..	..
Chicago R. & Q. R.R	37,634	..	..
B. & M. R.; B.R.	7,371	..	..
Union Pacific R.R. Co.'s mines	..	..	..
" " " other mines	..	..	..
Summit County R.R.	..	..	..
Keokuk & Des Moines R. R.	..	..	..
Denver & Rio Grande	3,104	..	..
Cairo & St. Louis	3,106	..	..

Receipts at Port Richmond, 1,500; shipments, 8,500 tons; and balance on hand 21,000 tons.

Receipts at Greenwich, Philadelphia:

	Bituminous.	Gas Coals.
Receipts	3,728	....
Shipments	3,862	....
On hand	....	157

The decrease of shipments of Cumberland coal over the Cumberland Branch, and Cumberland and Pennsylvania Railroads, amounts to 55,603 tons.

The receipts at Buffalo, via. L. S. & M. S. R.R. for the week were 2,761 tons.

	week.	year 1875.	year 1874.
The receipts of coal at Coal Port (Trenton)	..	..	4,554
" " " South Amboy	181	16,807	153,083
Shipments at Coal Port (Trenton)	..	..	1,964
" South Amboy	8,589	70,269	111,687

There is a very good demand for anthracite coal. Under date of March 20, the Delaware and Hudson Canal Company and the Delaware, Lackawanna and Western Railroad Company issued circulars announcing prices for April, which are as reported by us in our last issue. The Pennsylvania Coal Company issued a circular to its contractors, under the same date, wherein they quote Lump, $4 60; Steamer, $4 60; Grate, $4 70; Egg, $4 80; Stove, $5 30. Chestnut, $4 35. The Lehigh and Wilkes-Barre Coal Company, the Philadelphia and Reading Coal and Iron Company, and the Lehigh Coal Exchange did not name prices. The Philadelphia and Reading Coal and Iron Company, in a circular dated the 20th inst., say: "There being no prospect of the miners and laborers in the coal region resuming work in time to produce coal during the month of April, no price circular for that month will be issued." Although prices have, in some instances, been named for April and the balance of March, yet it is impossible for the ordinary buyer to procure coal at the published rates. The coal that is in the market is being carefully divided among the contractors of the companies having it for sale, and they (the contractors) are asking an advance of about 20c. per ton over circular rates, and are unable to make prompt delivery. We hear of $6 f. o. b. being offered for 5,000 tons of Lehigh Egg, and $6 50 being asked. The demand being ahead of the supply, those having small stocks are asking full November prices. The Delaware and Hudson Canal Company and the Pennsylvania Coal Company are both cut off from market awaiting repairs on the Erie Railroad. It is expected that shipments will be resumed sometime next week.

The miners' strike stands without any change. All appear to have settled down to the belief that there will not be a resumption of work before the first of May.

The places of the Delaware & Hudson Canal Company's engineers and pumpmen, who struck for an advance of wages last week, were promptly filled, and the output was affected but little by their action.

The Ohio and Pennsylvania Coal Company's miners, at Steubenville, Ohio, went out on a strike on the 23rd inst. They demand an advance of half a cent per bushel for digging.

A slight movement has been made in Bituminous Coals. We are reported sales of from 8000 to 10,000 tons of Cumberland to the Flushing Railroad, and 10,000 tons to be delivered to the Grand Trunk Railway, at Portland, at $6 10. It is a little early for much activity in bituminous coals, but short stocks, and the scarcity of anthracite, will have a tendency to forward business. There is much satisfaction expressed among the dealers in bituminous coals, owing to the continuation of troubles in the anthracite regions; as they expect to be able to introduce their coal to an entirely new trade, and think that when the grate bars have once been changed to suit the new fuel, it will be very difficult to re-introduce Anthracite. A movement of the stock coals at Georgetown has commenced, owing to numerous arrivals of vessels at that port, and favorable freights. The Chesapeake and Ohio Canal has reduced its rates 8c. on tolls of 51c. and shipping charges of 8c. It is not yet given out whether the reduction will take place on

tolls or freight, or on both. It was anticipated that a greater reduction would be made, and considerable dissatisfaction is expressed by those who have heretofore shipped largely through the canal. It is thought that the existing rates will have a tendency to divert considerable business to Baltimore.

There is nothing doing in Gas Coals. No sales of Nova Scotia coals have as yet been made. The miners at the Penn and Westmoreland mines continue on strike, with no prospects of a speedy settlement.

Freights are without material change. The ruling rate from this port to Boston is $2.15. From Baltimore and Georgetown, $2.25 is being paid to Boston; $1.65 to this city; and $2 to Sound ports, vessels continuing to offer freely at $2, for the season, from Baltimore to Boston. MESSRS. PERKINS & JOB, in their circular dated the 20th inst, says: "Notwithstanding the heavy arrivals of tonnage at our principal sea ports, freights generally have been well maintained. From the Provinces.—Present appearances indicate a late opening of navigation at the different coal ports in the Provinces. Our ideas relative to the freights likely to rule to the States, were indicated in our circular of March 6th. We see no reason to change them at this time."

Wholesale Prices of Anthracite Coal f.o.b., at the Tide Water Shipping Ports per ton of 2240 lb.

The prices of the Lackawanna, Scranton and Pittston Companies, in the following table, are all that have been fixed as yet for the month of April.

	Lump.	Steamer.	Grate.	Egg.	Stove.	Chestnut.
Wyoming Coals.						
†Lackawanna and Scranton at						
Elizabethport & Hoboken	4 60	4 70	4 80	4 95	5 40	4 40
Pittston at Weehawken	4 60	4 60	4 70	4 80	5 30	4 35
Wilkesbarre at Port Johnston	....	....	....	....	....	....
Plymouth, R. A	....	..	....	....	....	....
Susque. Coal Co. at Amboy W.A.	....	....	....	....	....	....
Kingston at Hoboken	....	....	..	....	....	....
Lehigh Coals.						
Old Company at Port Johnston	....	....	....	....	....	....
Old Company's Room Run "	....	....	....	....	....	....
Sugar Loaf at "	....	....	....	....	....	....
Lehigh Coal Exchange "	....	....	....	....	....	....
Honey Brook at Elizabethport	....	....	....	....	....	....
Spring Mt. C. Co. at Hoboken	....	....	....	....	....	....
Beaver Meadow at South Amboy	....	....	....	....	....	....
Schuylkill Coals.						
Schuylkill white ash	....	....	....	....	....	....
Schuylkill red ash	....	....	....	....	....	....
Shamokin white and red ash	....	....	....	....	....	...
N. Franklin	....	....	....	....	....	....
Lorberry	....	....	....	....	....	....
Lykens Valley	....	....	....	....	....	....

Pittston coal is delivered to carts in New York or Brooklyn at 65 cents per ton in addition to the above rates.

Per ton.

Freight from Hoboken and Weehawken to New York..... 45c.
" " Elizabethport & Port Johnston to New York. 45c.
" " South Amboy to New York..... 50c.

Freight from Rondout to New York, by boats or barges of the D. & H. Canal Co., 50c. per ton.

Wholesale Prices of Bituminous Coal.

The following prices are principally fixed for the season, except where otherwise indicated.

Domestic Gas Coals.

Per ton of 2240 lb.	At the Shipping Ports.	Alongside in New York.
Westmoreland and Penn, at Greenwich,		
Philadelphia	$5 20	$6 50
" at S. Amboy	6 00	6 50
Red Bank Cannel Pa., at Phil	8 00	8 50
" " at S. Amboy	8 50	....
" Orrel, "	6 50	7 00
" " at Philadelphia	6 00	....
Youghiogheny, Waverly Co, at Baltimore	....	6 60
Despard, West Va., nominal "	5 00	6 60
Murphy Run, W. Va. at Baltimore, nom.	5 00	6 60
Fairmount, W. Va " nominal	5 00	6 60
Newburgh Orrel, Md. " "	5 00	6 00
Cannelton Cannel, W. Va., at Richmond.	9 50	11 50
" Splint, " " nom.	5 25	7 00
Peytona Cannel, " " "	9 50	11 50
Straitsville, " At Sandusky, O, "	3 65	11 60

Foreign Gas Coals.

	Sterling.	Am. cur'cy.
Newcastle, at Newcastle-on-Tyne	10/6@12/9	6 50@ 7 00
Liverpool House Orrel, at Liverpool	26/	13 00
Ince Hall Cannel "	47/	18 00@20 00
" Gas Cannel "	36/	15 00
Scotch Gas Cannel, at Glasgow, nominal.	28/	9 50
	Gold.	
Block House, at Cow Bay, N.S.	2 00	6 50
Caledonia, at Port Caledonia	1 75	5 70
Glace Bay, at Glace Bay	1 80	5 50
Lingan, at Lingan Bay	1 75	....
Sydney, International and Reserve mines, at Sydney	2 00	5 75
Pictou, Albion and Vale mines, at Pictou	2 50	6 50

Steam and House Coals.

Broad Top, at the mine, $1.25; at Amboy	4 75@5 00	5 25@5 50
Cumberland, at Georgetown and Alexandria, Va.	4 20@4 40	6 00@6 25
Cumberland at Baltimore	4 25@4 50	6 00@6 25
Clearfield, "Derby," "Kitanning," "Sterling," and "Eureka," at the mines, $1.25; at Greenwich, Phil	4 60	5 80
James River, carbonite, at Richmond, Va	6 75	9 00
" bituminous, " nom.	4 00	6 25

Retail Prices in New York.

Anthracite.

Per 2000 lb.	Grate and Egg.	Stove. Chestnut.
Pittston coal, in yard	$6 00	$6 20 $5 40
Lackawanna Coal, del'd	7 60	7 85 7 10
*Wilkes-Barre, delivered	7 60	7 85 7 10
Lehigh & Locust Mountain, del'd	8 00	8 00 7 50
Schuylkill Red Ash del'd	8 25	

The cost of delivering Pittston coal ranges from 40 cents to $1 per ton, according to distance from the yard.

* Twenty-five cents less than the above rates are charged to manufacturers.

Bituminous.

Liverpool House Orrel, delivered, per ton of 2000 lb				$23 00
Liverpool House Cannel	"	"	"	25 00
American Cannel	"	"	"	16 00
American Orrel	"	"	"	$15 00@16 00
Straitsville Cannel	"	"	"	15 00@16 00
Carbonite	"	"	"	12 00
Cumberland	"	"	"	9 00
Acadia, Pictou, N. S.	"	"	"	14

Philadelphia Coal Trade.

PHILADELPHIA, March 25, 1875.

After repeating, week after week, that the supply of anthracite coal on hand is decreasing and that the amount of coal produced is not sufficient to meet the demand, you need not be surprised to hear shortly that there is a coal famine. The stocks at Port Richmond are nearly exhausted. No Shamokin has come down the Reading for a few days, owing to a difficulty with the hands on the lateral roads which is reported to be but temporary. The shipments of anthracite from this port are now confined to Lyken's Valley and Shamokin coals from the Greenwich piers of the Pennsylvania Railroad. Freights to Boston $2

In the discussions which take place respecting the relative merits of the contending parties, one side or the other is taken according to the interest or wishes of the writers, and your paper is the only one trying to reach impartial conclusions. To attain that desirable object, it is necessary to look upon the Workingmen's Benevolent Association, as it is managed, as a curse to everybody, and more particularly to the workingmen themselves; and the associated companies as a greater curse from the fact that neither will confine itself to its business. The first assumes ownership of the mines and dictates to the owner what he shall do with his property, the other also assumes to dictate to the mine owner when he shall work and how much he is to do. The one is the excrescence of the other, and both are diseases. As one gets stronger it seems to give strength to the other, and the existence of either one is an impediment in the way of reaching a healthy state of things. The Workingmen's Association, by attempting to keep up wages too high, attracts workmen from other sections and occupations to the coal region and increases thereby a production already too large. As a consequence, work is not steady and the men are not as well off with high wages as they would be at more moderate ones and steadier work. The companies by high tolls and high prices, decrease the consumption of anthracite considerably. Each side is therefore engaged in magnifying the evil it pretends to cure, and as two powers cannot regulate the same business at the same time, the result is a bitter struggle characterized by a good deal of obstinacy and bad temper, and the anthracite coal trade will never be restored to what it should be, and subject only to the natural laws of supply and demand, until both parties get well whipped.

Baltimore, Md. March 23, 1875.

Reported by our Special Correspondent.

WHOLESALE PRICES PER 2240 lb.

ANTHRACITE.

	By cargoes.	In cars.
Wilkes-Barre, "Lee," or "Diamond,"		
Lump, steamboat	$5 15	$5 60
Broken	5 50	5 75
Egg	5 87	6 15
Stove	6 07	6 35
Pittston and Plymouth.		
Lump and steamboat	....	5 50
Broken	....	5 70
Egg	....	6 05
Stove	....	6 25
"Boston," freeburning white ash	....	5 50
Egg	5 87	5 70
Stove	6 07	6 05
Shamokin, (red or white ash)	....	6 25
Egg	5 82	6 05
Stove	5 92	6 15
Lykens Valley, red ash, egg and stove	6 02	6 55

From wharf or yard, wholesale, 50@75c. additional.
By retail, all kinds and sizes, per 2,240 lb, $7@8 25.

BITUMINOUS.

George's Creek and Cumberland f. o. b. at Locust Point for cargoes	4 60	4 75
West Va. Gas Coal f. o. b. at Locust Point	5 50	....
Kanawha Cannel, coarse	13 00	....
Tyrone	7 25	....
Ritchie Mineral of West Virginia	1 00	....

Boston. March 23, 1875.

Reported by our special correspondent.

CARGO PRICES TO TRADE.

Lingan coal	$ 5 75	Westmoreland, and Penn.	7 25
Caledonia	5 00	Waverly Co. Youghiogh'y	7 25
Pictou	6 15	Cannelton Cannel	11 75
Block House	5 60	Cumberland	6 25@ 6 50
Red Bank Cannel	10 00	Anthracite	.6 50@ 7 25
Glace Bay	5 00	" Retail	.7 50@ 8 00
Sydney	7 00		

Buffalo, N. Y. March 23, 1875.

Per ton of 2000 lb.

	Slack.	Nut & Slack.	Nut.	Lump
Connelsville coke				5 80
Sterling cannel				6 00
Red Bank				5 75
Youghiogheny coal for gas				4 75
Briar Hill coal		3 25		4 85
Monterey "		3 25	3 60	3 75
Catfish "		3 25	3 60	3 75
Stoneboro "	2 75		3 75	

Briar Hill coal, and Stirling and Red Bank cannels retail at $7 50; all other coals $1 per ton above wholesale prices.

Anthracite f. o. b. vessel.

Grate	6 70	Stove	7 15
Egg	6 70	Chestnut	6 65

Retail prices delivered and screened, $1 per ton additional.

Chicago, Ill. March 23, 1875.

Specially reported by Messrs. RENO & LITTLE, Coal Merchants.

No change in prices of coal. Stocks of anthracite coal are getting low. Most of the yards will be cleaned out by the opening of navigation.

Retail prices per ton of 2000 lb. delivered to buyer.

	BITUMINOUS.	
Lehigh Lump	$10 75	Briar Hill and Erie 7 50@ ....
Lehigh prepared and car load lots	10 25	Walnut Hill (W. Va.) 6 50@ ....
Lackawanna, Wilkes-Barre and Pittston,*		Midway (West Va.) 6 50@ ....
		Cannel 8 00@ 9 00
Grate, egg, and chestnut.	10 00	Blossburg 8 00
Stove or range	10 00	Indiana Block 6 00
		Hocking "Brooks" 6 00
		Wilmington and Illinois.. 5 00

*75 cents off these prices for car load lots to country dealers and manufacturers.

Cincinnati, O. March 23, 1875.

Please quote prices same as last week.

Per ton of 2000 lb.

	Bush.	Ton.
Youghiogheny, or Pittsburgh, afloat	9 c.	—
Pomeroy coal	" 6½c.	—
Cannel coal	—	—
Semi Cannel	—	—

The following are retail prices delivered:

Yougiogheny	— c.	$3 35
Pomeroy	— c.	2 80
Cannel	— c.	5 60
Kanawha Semi Cannel	— c.	3 35
Anthracite		10 00
Foundry coke	— c.	5 80
Soft coke	10 c.	—

Cleveland, O. March 23, 1875.

Reported by our Special Correspondent.

Per ton of 2000 lb. on cars.

Youghiogheny, l'p	$4 40	Columbiana	$3 00
Youghiogheny, nut	3 40	Strip Vein	3 20
Briar Hill, according to quality	$3 85 to 4 00	Mountain Blossburg (blacksmith)	5 50
Massillon	3 65	American Cannel Coal Co.s Cannel	4 50
Hocking Valley	3 25		
Straitsville	3 25		
Anthracite, Lackawanna on cars, Egg			$6 85
" " " "		Stove	7 50
" " " "		Chestnut	7 00
Youghiogheny Coke, " "		here	5 25
Connellsville " " "		"	5 50

50 to 75 cents per ton additional for delivery at retail.

Detroit, Mich. March 23, 1875.

Specially reported by Messrs. ROBINSON & KEYS, dealers in all kinds of coal.

The cold weather hangs on, despite the lateness of the season, and orders are still coming in quite freely. Prices remain firm at last quotations.

Per ton of 2000 lb.

Lehigh Lump, per ton	$10 50	Blossburg	8 50
Lehigh " prep. sizes	10 00	Briar Hill	7 50
Wilkes-Barre, Grate and Egg	9 00	Willow Bank	7 00
		Erie	7 50
Wilkes-Barre, Stove and Nut	9 50	Massillon	7 00

Erie, Pa. March 23, 1875

Reported by our Special Correspondent.

Wholesale, per ton of 2,000 lb.

Bituminous f.o.b.

Briar Hill lump	$4 00	Beaver lump	$4 00

Indianapolis, Ind. March 22, 1875.

Specially reported by Messrs. H. McCOY & Co.

Per ton of 2000 lb.

BITUMINOUS.

Wholesale on board cars in city.

Block coal	$2 50@$2 75	Indiana cannel	6 75
Best "	2 40@ 2 50	Hocking Valley	4 25
Block Nut, per car	18 00	Youghiogheny	5 00
Highland " "	18 00	Blossburg (smithing)	6 50
Block slack, per car load	....	Piedmont "	7 75
Peytona, cannel per ton	8 75	Gas coke, ... per bushel.	80

ANTHRACITE (Lackawanna).

Grate	$8 70	Chestnut	8 60
Egg	8 70	Stove	8 85

Retail, per bushel of 70 lb.

Block	16c.	Peytona Cannel	32c.
Highland	14	Indiana "	26
Highland Nut, dom. use	9	Youghiogheny	24
Block " "	9	Blossburg	26
Slack, steam, "	8	Piedmont	30
Block & Highl'd Mt. steam—			

ANTHRACITE.

	per ton.		per ton.
Grate	$11 00	Stove	$11 00
Egg	11 10	Chestnut	11 00

Louisville, Ky. March 23, 1875.

Specially reported by Messrs. Byrne & Speed.

Please report our market same as last week.

Pittsburgh, per load of 1900 lb	$3 75
Pine Hill	3 25
Buckeye Cannel	5 00
reyiona Cannel	5 50
Nut and Slack	2 25
Pine Hill nut	....
Kentucky lump, per load	....
" nut, "	....
" Slack "	....
City-made Coke, per bushel	....
Pittsburgh, wholesale, per bush.	....
Kentucky on cars at wholesale, per bush.	....
Anthracite, per ton	$10 to $10 50

Milwaukee, Wis. March 22, 1875.

Specially reported by Messrs. R. P. Elmore & Co.

Retail prices per ton of 2000 lb.

Lehigh Lump	$10 00	Briar Hill, select	$8 50
Lehigh Prepared	10 50	Bloesburg	8 00
Lackawanna	9 50	Pittsburgh	7 50

New Orleans, La. March 20, 1875.

Please report our quotations as follows :

Pittsburgh coal, retail, per bbl	75c
" wholesale	30c.
" to steamboats, per box	60c.
" to manufacturers, per bbl	65c.
" shipments per hhd	$7 00
Anthracite, retail, per ton	$12 50
" wholesale per ton	....
Spadra (Arkansas) coal, retail, per bbl	75c.
Mt. Carbon, wholesale, per bbl	45c.
" " retail per bbl	65c.
Virginia Cannel, per bbl	90c.
Scotch Cannel, per bbl	1 00

Pittsburgh, Pa. March 23, 1875.

Reported by our Special Correspondent.

Per ton of 2000 lb. and Bushel of 76 lb.

	per ton.		per ton
Youghiogheny coal	$2 00	Pittsburgh retail delivered per bushel	9c@10c
" coke	2 00@2 25	Anth'cite on cars Lehigh	$7 75
Connellsville coal	2 10	" " Wilkes-Barre	6 75
" coke	$2 25@2 50		
Pittsburgh coal	1 85		

Twenty-five to fifty cents per ton additional for delivery.

The *Pittsburgh Commercial* of March 16th, reports the following additional departures of coal : To Cincinnati, 85,000 bushels ; to Louisville, 530,000 bushels.

Toledo, Ohio. March 22, 1875.

Specially reported by Messrs. Gosline & Barbour.

Per ton of 2000 lb.

Retail.		Retail.
Wilkes-Barre and Scranton,	Bituminous.	
Large and Small Egg,	$8 50	Blossb'g and Cumberl'd, $9 00
Stove	8 50	Massillon Lump	6 00
Chestnut	8 50	Briar Hill	6 50
Lehigh Lump	10 00	Massillon	6 00
		Hocking Valley, scd & nut	5 00

Soft coal screened retails from $4 00 to $6 00, according to quality.

Halifax, N. S. March 22, 1875.

Reported by our Special Correspondent.

Prices per ton of 2240 lb. in gold.

Sydney (old mines)	$4 50	Little Glace Bay	3 50
Gowrie	2 50	Blockhouse	4 00
Victoria	3 50	Albion (at Railroad)	4 25

Montreal. March 23, 1875.

Specially reported by Messrs. Robert Adams & Co.

Wholesale per ton of 2,240 lb.

Scotch Steam	$6 25	Cape Breton Steam	$5 75
Pictou "	6 00	Newcastle Smiths	....

Anthracite at retail, 2,000 lb., delivered, less 5 per cent.

Egg	$8 50	Chestnut	9 00
Stove	9 50		

Toronto, Ont. March 22, 1875.

Reported by our Special Correspondent.

ANTHRACITE.	per ton.		per ton.
Broken	$7 65	Chestnut	$7 65
Egg	7 65	Lehigh	9 00
Stove	8 15		
BITUMINOUS.			
Blossburgh	7 50	Screenings	5 00
Briar Hill	7 00	Soft Nut	5 50

Freights on Bituminous Coals from the Mines to Tide-Water Shipping Ports.

From the Mines to Cumberland and State Line (say an average of 20 miles) the charge is 3 cents per ton of 2240 lb. per mile.

From State Line to Amboy (346 miles) $3 75 per ton of 2000 lb. On coal shipped beyond this point there is a drawback of 50 cents per net ton.

From Cumberland to Baltimore, (178 miles) $2 31 per ton of 2240 lb., or $2 02 per net ton, and 4 cents per gross ton for use of cars.

From Cumberland to Georgetown, (152 miles) by canal, not open.

From the Mines to Piedmont, (from 4 to 10 miles) 5 cents per ton of 2240 lb per mile on distances less than 5 miles, and 4 cents per ton per mile on distances not over 10 miles.

From Piedmont to Baltimore, (206 miles) $2 69 per ton of 2240 lb., or $2 40 per net ton.

From any point in the Kanawha Valley to the James River wharves below Richmond, (say 350 miles) by C. and O. R. R., including terminal charges, per ton of 2240 lb., for Cannel coal, $4 50.

Do., do., for Semi-Cannel or Splint, per ton of 2240 lb., subject to rebate on shipments of 5000 tons or more, $3 65.

From Irwin to W. Phila. (say 332 miles) per P. R. R. Penn. Westmoreland gas coal, per ton of 2000 lb $4 75

From Oscoola to W. Phila. (say 218 miles) per T. & C. R. R., per ton bituminous coal of 2000 lb 3 30

From Fairmount and Clarksburg to Baltimore (say 300 miles) via B. & O. R. R., including loading, per 2000 lb ....

On through coal after deducting drawback ....

From Richmond, Va., to New York, 392 miles per 2000 lb.. 2 00

" " " *Boston*, about 650 " " 2 50

" " " *Philadelphia*, 292 " " 1 25

From the Mines to Richmond, via James River and Kanawha Canal, 15 miles 15

Rates of Transportation on Anthracite Coal to Tide Ports.

Lehigh and Wyoming Coals. per ton of 2240 lb.	From Penn Haven.	From Mauch Chunk.	From Hazleton.‡‡	From Upper Lehigh.	From Ashley and Sugar Notch.
To ‡ Newark, N. J. via Central Railroad of New Jersey	2 89	2 73	2 86	3 24	3 45
‡ Mauch Chunk, Pa. via Central Railroad of N. J.	16	..	56	51	72
‡ Phillipsburg, N. J.	1 69	93	1 34	1 44	1 65
‡ Elizabethport, Port Johnston, Hoboken and South Amboy, N. J. shipping and wharfage 35c. add.	2 47	2 31	2 80	2 82	3 03
High Bridge, N. J.	2 40	2 20	2 80	2 79	3 09
Somerville and Raritan, N J.	2 80	2 69	3 20	3 19	3 49
Elizabeth, Cranford, Westfield and Elizabethport, for consumption.	2 95	2 75	3 35	3 34	3 64
¶ Jersey City, N. J., and New York, via Morris Canal	2 85	2 35	3 17	3 24	3 54
Andover, via Delaware, Lack. and and Western RR	3 30	3 10	3 70	3 69	3 99
§ Trenton, Somerset Junction and Greensburg, via P. RR. Belvidere Division	2 65	2 45	3 05	3 04	3 34
Trenton, for shipment, including shipping and wharfage	2 11	1 95	2 45	2 46	2 76

‡‡ Rates on line coal from Hazleton are 10c. per ton above these figures.

‡ The cost of unloading is to be added to these rates. No charge less than 40c. per ton will be made for any distance. Tolls from Mauch Chunk to Phillipsburg for way points will be $1 15 per ton.

§ Twenty cents per ton less when five cars at a time to one party. Provided that where the reduction makes the rate $1 a ton, or less, the rate will be $1.

¶ 20 cents per ton additional for transferring coal from boat to boat, and 30 cents per ton for reshipment of same from wharves.

The following rates of freights and tolls on Schuylkill coals are to take effect from and after March 1, 1875 :

Schuylkill Coals. per ton of 2240 lb.	From Pine Grove.	From Tamaqua.	From Port Carbon.	From Mount Carbon.	From Schuylkill Haven.
To * *Port Richmond*, for shipment, via P. & R. R. R., Main Line	1 87	1 82	1 75	1 74	1 67
Philadelphia, Retail yards	1 97	1 92	1 85	1 84	1 77
Harrisburg, via Lebanon Valley Branch	1 23	1 80	1 73	1 72	1 65
Allentown, via East Pennsylvania Branch	1 52	1 47	1 40	1 39	1 32
Lancaster, and Points on Lancas. Branch, via R. & C. R.R.	1 57	1 52	1 45	1 44	1 37
Dauphin, via Schuylkill and Susquehanna Branch	62	....	1 25 via Aub	1 24 urn.	1 17
Jonestown, via Lebanon and Tremont Branch	86	....	1 69	1 68	1 61
Lebanon, via Lebanon and Tremont Branch	90	....	1 88	1 87	1 80

* On and after March 1, 1875, a charge of fifteen cents per ton will be made for shipping anthracite coal at this point.

From *Tamanend* to *Catawissa*, via Catawissa and Williamsport Branch Railroad 94

From *Tamanend* to *Williamsport*, via Catawissa and Williamsport Branch Railroad 1 39

THE BRITISH COAL AND IRON TRADES.

From our exchange bearing date to March 6, 1875.

North of England.—There is a fair demand for house and gas coals, but very little doing in steam coals. The lock-out in Wales has not improved the demand for steam coals, as was anticipated. A better demand is anticipated when the Baltic ports are free of ice. Prices have advanced in anticipation of trouble between the miners and the masters. Coke has been quoted at the ovens at 17/@18/ and even more, although sales have been made of ordinary good Durham furnace coke at 16/ 6d. Unscreened coals are from 5/ 6d.@6/ 6d., and screened 7/ 6d.@8/ at the pits. Notices have been given at most of the pits in the county of Durham, that the present engagements will terminate on the 13th inst., and that the new rates of wages will have to be at a figure which would leave them but 10 per cent. above those paid in 1871. This is equal to a reduction of 20 per cent. There has not been much inquiry for iron during the past week, the market being somewhat unsettled on account of anticipated troubles from the miners. Owing to the troubles in Wales, some orders have been placed in the North of England, which would otherwise have gone to the former district. No. 1 Pig Iron is quoted at £3 4/; No. 2, £3 1/ 6d.; No. 3, £2 19/; and No. 4, Forge, £2 16/ 6d. Rails of ordinary section are £7, and light rails £7 5/ @£7 10/.

Barrow-in Furness.—The demand for iron remains steady but there is no pressure of orders. Makers generally have a fair amount of orders booked, and in some cases, they are refusing to accept orders for delivery before June or July. Buyers are, however, withholding orders to a certain extent, with the belief that prices must soon be lower. The deliveries of iron to South Wales and the Midland Counties are large. No. 1 Bessemer Pig is quoted at 83/ at the works; No. 2, 82/ 6d.; No. 3, 80/; and No. 4 Hematite Forge at 80/. The coal trade remains dull, and the purchases being made are small. The large manufacturers in this district have mostly secured their own coal pits in the Lancashire and Yorkshire districts, and are raising their own coal. An effort is being made to find coal in the neighborhood of Barrow, it is said with good prospects of success.

Yorkshire and Derbyshire.—Correspondence from Leeds states that although the weather is very cold the coal business does not improve. The supply of household coals is far ahead of the demand. The strike at the Dewsbury collieries is without change, both men and masters appearing firm in their position. The iron business of this district continues more quiet than was anticipated at the beginning of the year. A correspondent writing from Barnsley says notices of a reduction of wages have been given in South Yorkshire and North Derbyshire which will affect about 25,000 miners. Under the existing condition of trade, it is thought the men will submit to a small reduction. A fair tonnage has been sent to London, still the consumption is decreasing. The iron trade is without change, mills and foundries being well employed. At Sheffield, considerable improvement has taken place in several branches of trade. Merchants and shippers hold light stocks, and many of the manufacturers are in a similar position. Bessemer steel rails are in better request. A good home demand exists for plates. Cast steel is in better demand than for some time past. The demand for America for cutlery has not increased.

Manchester.—Generally, the tone of this market continues remarkably steady, and if anything, there has been a firmer feeling during the past week. The continuation of the severe weather has maintained a brisk demand for all classes of house coals. Good furnace coal, also continues in demand, and this class of fuel is so scarce that forge proprietors, in some instances, have been compelled to fall back upon inferior descriptions of coal in consequence of their inability to obtain the classes suitable for puddling. Gas coal is still in active demand. There has been more inquiry for coke. House coals are quoted at 14/@15/; common coal, 10/@12/ 6d.; burgie, 7/@8/; slack, 5/ 6d.@6/ 6d. per ton, according to quality. The iron business is very quiet. There has been a better inquiry for pig, but it has not resulted in any large sales.

North Staffordshire.—The iron trade is very quiet. £9 per ton for crown bars is considered a top price. Manufacturers say, that in view of the decline of prices during the last few months, they will be compelled to reduce wages.

South Staffordshire.—There is a good demand for household coals, while furnace and steam coals are in restricted demand, and slack a drug in the market. Furnace coal is quoted at 11/ @14/ per ton. There is but little doing in the iron trade. Common Cinder Pig is quoted £3 2/ 6d.@£3 5/ per ton. A fair reliable quality of Part-Mine Pig is to be had at £4, while All Mine is £5 per ton. Unbranded Bars are offering at £8 17/ 6d@£9.

Wales.—The non-associated companies are working to full capacity, and considerable coal is going to some ports. There are no indications of the strike terminating speedily. There is a disposition manifested to blow out the furnaces. The iron trade is being diverted to other districts, from the inability of manufacturers to fill orders.

Scotland.—The iron business is more quiet and warrants are declining. The market closed on the 4th inst. at 74/ 6d. The quantity of pig iron in Connal's stores, on Monday afternoon, was 28,707 tons, being 2115 less than at the same time the previous week. There is scarcely any alteration in the prices of the principal makers' brands, which are as follows :—Gartsherrie, No. 1, 88/ 6d.; No. 3, 78/; Coltness, 92/ and 77/; Summerlee, 87/ 6d. and 76/; Langloan, 92/ and 77/ ; Gowan, 76/ and 74/; Calder, 90/ and 76/; Shotts, 87/ 6d. and 77/; Carnbroe, 84/ and 76/; Monkland, 76/ and 74/; Clyde, 76/ and 74/ ; Glengarnock, 86/ and 77/; Eglinton, 76/ and 74/; Dalmellington, 75/ and 74/; Kinneil, 82/ 6d. and 73/; Carron, 77/ 6d. and 75/. The shipments of pig iron from Scotch ports for the week ending the 27th ult. amounted to 7806 tons, showing a decrease of 2774, as compared with those of the corresponding week of 1874. The imports of Middlesbrough pigs, at Grangemouth, for the week were 1519 tons, being 1860 less than in the corresponding week of last year. Throughout this entire district the coal trade remains exceedingly dull. At collieries supplying ironworks, there is, it is true, a fair amount of activity, but all the sale works are slack. Steam and shipping coals are much neglected, and the supply of household sorts is everywhere super-abundant. The prices are :—House coal, 10/ to 15/; steam, 10/ 6d. to 12/ 6d.; splint, 9/ 9d. to 10/ 6d.; smithy, 17/. Last week's shipments amounted to 43,018 tons, showing an increase of 6398 as compared with those of the corresponding week of last year. The miners at Swinhill, Stonehouse, have returned to work at a reduction of 4d. off splint coal and 1d. off soft coal.

IRON MARKET REVIEW.

Import Duties.

The following are the duties in Gold on Iron:

Flat Iron, not less than 1, nor more than 6 inches wide, nor less than ⅜, nor more than 2 inches thick. *Round Iron*, not less than ¾, nor more than 2 inches in diameter, and *Square Iron*, not less than ½, nor more than 2 inches square per pound 1 c.
Flat Round or Square Iron, of larger or smaller sizes than the above mentioned, per lb ..... 1½c.
Provided, that all iron in slabs, blooms, loops, or other forms, less finished than bars, and more advanced than pig iron, except castings, shall pay the same as iron in bars.
Provided, that none of the above iron shall pay less than 35 per cent.
Railroad Bars—Iron.....70c. per 100 lb.
Railroad Bars—Steel.....$1.25 per 100 lb.
Boiler plates, or other plate iron not less than 3-16 of an inch thick, per lb..... 1½c.
Scrap castings per ton..... $5 40
" *wrought* " " 7 00
Pig iron per ton..... 7 00
Iron ore 10 per cent. *ad valorem*.

New York.

March 26, 1875.

American Pig.—The demand does not increase. The general report is that business is about as dull as it can be. We are given no sales of sufficient size, to enable us to form an opinion of prices. We quote No. 1 Foundry at $27@$28; No. 2, $26; and Gray Forge, $24@$26. The Thomas Iron Company consider themselves out of market until they are more certain of a supply of coal. They still continue to use coke, but are as yet unable to give results. Other companies are freely offering iron at our quotations, and we have no cause for changing our belief of a weak inclination of prices. Although the coal strike has lasted about three months, it has not resulted in a materially decreased production of iron, and from the actual business done, since the first of the year, it would naturally be supposed that stocks are accumulating. Although we reported considerable sales during January, it must be borne in mind that the majority of them were for delivery through the season, and, in most cases, not actual contracts, but an estimate of the quantity of certain brands, likely to be wanted and to be ordered during the season as required. The strike of the Anthracite coal miners shows no new features. There are still no indications of a speedy resumption of work. We are favored with an article on "The increasing use of coke in the metallurgy of iron," which will be found in another column, and which is well worthy of the attention of our iron masters.

Scotch Pig.—There has been no business worthy of note, the enquiries being confined to the immediate requirements of consumers, and sales mostly in 5 and 10 ton lots. We quote Eglinton at $34@$35, and Coltness at $37@$38. There is a light stock, and but little on the way that is not already sold. MESSRS. WM. COLVIN & CO., under date of Glasgow, March 9, say:—"The Warrant Market continued firm towards the end of last week, and closed on Friday at 74/ 9d. Yesterday the price ranged from 74/ 10d. to 74/ 6d, closing at the lowest. To-day the market opened at 73/ 6d., and closed with buyers at 73/ 7¼d cash, and sellers at 73/ 9d. There is not much change to report in Maker's Iron, but in one or two instances slight reductions have taken place." Cable quotations report a slight declining in makers' brands.

Rails.—During the last four weeks there have been negotiations going on for the purchase of lots of English rails, the quantities of which have just been made public, and amount to 10,200 tons of 56 lb., in bond, on private terms, and 900 tons of 50 lb. at $36 gold, in bond. The latter lot was purchased on Nova Scotia account, and of the former, 2000 tons were for Canada at $42 50@$45 gold, delivered. These sales are reported to take up all the available English rails in this market. Although these sales make a large aggregate, they do not indicate an improvement in our own demand, as they were purchased for foreign shipment. The holders offered the rails so low, that it was an inducement to purchase, and place them in competition with the Welsh mills; and the remainder of the stock, not already placed, is offered at figures which give it the advantage, to wit, at $38@$40 gold, in bond. The business in English rails was very much unsettled by the belief that lower prices would be named, which was encouraged by certain brokers. With the prospects of a continuation of troubles in Wales by the strikes, and no prospects of a decline in prices, there is no doubt that the remainder of the stock here will soon be closed out, either to Canada or South America. By mail, the latest quotation was £6 17/, f. o. b. Cardiff, without being able to procure early delivery. In Bessemer steel rails there has been a sale of 5000 tons to one of the Pacific railroads on private terms. We quote American, at mills, at $48@$50, and steel at $72 50@$75.

Old Rails.—There is no business doing, so we quote nominally at $30.

Scrap Iron.—There have been no transactions since our last. Prices are more firm—$36@$37 being asked; $35 was offered for 1000 tons, and refused, the holder being firm at $36, cash

Boston.

March 20, 1875.

From the *Commercial Bulletin*.

Pig is quoting firmer in dealers' hands, one or two of the highest fancy brands quoting up to $32@33, but the only transaction known approximating to these figures is a five ton lot of Lehigh at $31 f. o. b. This sale is a sample of the business going,—very trivial lots at extreme prices, and at that very few indeed to report. Leading brokers doubt if 30 tons a week have been sold to foundries since the month set in. The largest foundries hereabouts are doing little or nothing, and it is exceedingly doubtful if they would touch a round lot of the best quality of No. 1 outside of $29 on wharf here, if at this value. This market was carefully drummed the past week by two New York dealers, who return home unable to discover ought else than an excessively dull and unsatisfactory trade. One or two leading charcoal brands have dropped their range of $50@55 to $45@50, the latter price representing the value at which one of the best and most popular brands is seeking contracts Scotch Pig is still without interest, quoting nominally, Eglinton $34@35; Glengarnock $37. Reports from Hoboken and Philadelphia make no variation in Anthracite, quoting No. 1, $27@28; No. 2, $24.50@26; Gray forge, $25@27. Bar is jobbing along in a quiet way, holding in tone of strength very satisfactorily. In refined $60 is the basis for all transactions, though a lower point, $59, is quoted by a large buyer as the very best he could secure on a round lot. In common a little inquiry exists at $55, at which price a few trifling sales have been made. The more uniform value is $56, to which price the trade generally adhere. A good deal of interest has been taken in the reported contract of the National Tube Company with a leading New England mill for 1000 tons plates. This new business results from the Pennsylvania strike, and is fairly illustrative of the saying. "It's an ill wind that blows nobody good." We notice the new shoe-shape price lists are from ¼c to ⅓c higher than a year ago, Rhode Island quoting 5½c@5¾c and Troy 5¼c. Steel has had a good deal of attention from the carriage makers, who have begun to canvass, and to take hold quietly. Prices for tire are stiff at 6¼@7c. Tool makers are a trifle more active, and again selecting for shovels, picks, and axes that are required to meet a growing mining demand. We quote American tool 15@15¼c; American Machinery 9¼@10c; English Tool, 16@17c. Copper is extremely dull both in spots and future, and prices for the week are ⅛c lower, quoting nominally 21¼@21¾. We quote New Sheathing 28; Bolts and Braziers 30c; Yellow Mettle Bolts 28c. Lead has lost much of the strength shown a week ago, and is quotably lower. This market is quite bare of domestic stock, and buyers are wholly indifferent, lots are offered from New York at 5¾c. Sheet and Pipe 9c c'y; Tin-Lined Pipe 16¾c; Bar Lead 9c, less usual trade or 10 per cent discount. Spelter is easy at 6¼c currency. Tin is somewhat depressed by the news from abroad, having lost £2 3s in London, with the East India markets quoting $23 easy. We quote at 21¼@22c gold for Straits. Refined English is unchanged for 21@21½c gold. Plates are active; we quote Charcoal I. C., $10@12 50; Coke $8@10; and Terne at $8@12 50 per box, currency

Cincinnati.

March 23, 1875.

Specially reported by MESSRS. TRABER & AUBERY, commission merchants for the sale of pig iron, blooms, ore, etc.

We have no change in pig iron to report since our last. The demand is light, but prices continue firm. We quote:

CHARCOAL.

Hanging Rock, No. 1, Foundry	$28 00@29 00	4 mos
" No. 2, "	26 00@27 00	4 mos
" Mill	26 00@ ...	4 mos
Tennessee No 1, Foundry	27 00@28 00	4 mos
Tennessee. No. 2 "	26 00@27 00	4 mos
" Mill	25 00@26 00	4 mos
Missouri, No. 1, Foundry	30 00@32 00	4 mos

STONE COAL.

Ohio No. 1, Foundry	27 00@28 00	4 mos
" No. 2, "	26 00@27 00	4 mos
Ohio Mill	25 00@26 00	4 mos
Missouri, No. 1, Foundry	28 00@29 00	4 mos
" No. 2, "	26 00@27 00	4 mos
" Mill	26 00@	4 mos

CAR-WHEEL.

Hanging Rock, C. B	45 00@50 00	4 mos
Tennessee "	40 00@45 00	4 mos
Missouri "	40 00@45 00	4 mos
Alabama "	40 00@45 00	4 mos

BLOOMS.

Charcoal	75 00@ 85 00	cash

SCRAP IRON.

Cast	75@ 1 00	cash
Wrought	1 25@ 1 50	cash

Chicago.

March 23, 1875.

Specially reported by Messrs. ROGERS & CO., dealers in Scotch and American pig iron.

Quotations are as follows:

No. 1 Coltness	$46 00@ ....
No. 1 Gartsherrie	45 00@ ....
No. 1 Summerlee	44 00@ ....
No. 1 Glengarnock	42 00@ ....
No. 1 Eglinton	40 00@ ....
Warner's "American Scotch"	41 00@ ....
Massilon No. 1 Foundry	37 00@ ....
No. 1 Grand Tower Mo. ores (Bituminous)	33 00@ ....
No. 2, " " "	30 00@ ....
No. 1 Mill	26 00@ ....
Union "A" 1 (Anthracite)	32 00@ ....
Union "B" 1 (Anthracite)	30 00@ ....
No. 1 Lake Superior (charcoal)	32 00@ ....
No. 2 Lake Superior "	30 00@ ....
No. 3 Lake Superior "	33 00@ ....
No. 4 Lake Superior "	35 00@ ....
Bessemer Steel Rails	85 00@90 00
New Iron Rails	55 00@ ..
Old Rails	28 00@30 00

Cleveland.

March 23, 1875.

Specially reported by Messrs. C. E. BINGHAM & CO., dealers in pig iron and iron ore

There has been no particular change in prices. We quote:

No. 1, Lake Superior Charcoal	32 50@....
No. 2, " "	32 00@....
No. 3, " "	32 00@....
No. 4, " "	32 50@....
Nos. 5 and 6 "	33 00@....
No. 1, Bituminous foundry	28 00@ ...
No. 2, " "	26 50@....
No. 1. " Gray Forge	25 00@....
American Scotch, No. 1, Cherry Valley	32 00@....
" " No. 2	28 00@....
No. 1, Massillon	31 00@....
B—1, "	29 00@ ....
No. 2, "	27 00@ ...

Indianapolis, Ind.

March 23, 1875.

Specially reported by NELSON KINGMAN, broker and dealer in pig iron, etc.

Trade very dull at prices named below.

New Rails at mill	$56 00@58 00	
Old Rails "	28 00@30 00	
Hanging Rock Charcoal Pig No. 1 foundry	29 00@32 00	4 mos
" " " " 2 "	27 00@30 00	4 mos
" " " Mill	25 00@28 00	4 mos
Car Wheel C. B	45 00@50 00	4 mos

STONE COAL.

Indiana No. 1 Foundry pig Red Short	30 00@33 00	4 mos
" 2 " " "	28 00@30 00	4 mos
" 1 Forge " "	....@	4 mos
" 2 " " "	....@	4 mos
Ohio No. 1 Foundry pig Cold Short	28 00@30 00	4 mos
" 2 "	26 00@29 00	4 mos
" Mill	25 00@28 00	4 mos
" No. 1 Foundry, Neutral	30 00@34 00	4 mos
" No. 2 " "	28 00@30 00	4 mos
Merchant Bar	2.35c.	3 mos
1st quality C. H. No. 1 Boiler Plates, per lb	5¼c.	3 mos
1st " Com. Sheet, for No. 24, W.G. "	4 c.	5 mos
1st " Charcoal Sheet " " "	6 c.	3 mos
Best Bloom Galvanized Sheet, discount 20 per cent		cash.
2d quality " " " 30 "		cash.

f. o. b in Indianapolis.

Louisville.

March 23, 1875.

Specially reported by Messrs. GEORGE H. HULL & CO.

The market is quiet, but without indications of any change in price.

The usual time, 4 months, is allowed on the quotations below.

HOT BLAST—CHARCOAL.

No. 1 foundry, from Hanging Rock ores	$28 00@29 00	
No. 2 " " "	26 00@27 00	
No. 1, forge, " "	25 00@	
No. 1, foundry, " Tennessee "	26 00@27 00	
No. 2 " " "	25 00@26 00	
No. 1, forge, " "	25 00@	
No. 1, foundry, " Alabama "	26 00@28 00	
No. 1 " " Iron Mountain "	28 00@30 00	

HOT BLAST—STONECOAL.

No. 1, foundry, from Missouri ores	28 00@29 00	
No. 2, " " "	27 00@28 00	
No. 1, forge " "	27 00@28 00	

COLD BLAST—CHARCOAL.

Wheel from Hanging Rock ores	40 00@50 00	
" " Tennessee "	35 00@38 00	
" " Alabama "	38 00@40 00	
" " Georgia "	38 00@40 00	
" " Missouri "	38 00@40 00	
" " Kentucky "	30 00@42 00	

Pittsburgh.

March 23, 1875.

Specially reported by A. H. CHILDS, Esq., commission merchant, for the sale of pig iron, blooms, ore, etc.

Metal market is quiet, and quotations unchanged.

No. 1 foundry	$26 00@27 00—4 mos
No. 2 foundry	24 50@25 00—4 mos
Gray forge	24 00@ ...—4 mos
White and mottled	22 00@23 00—4 mos

The *Pittsburgh Commercial* of March 20, says:

"The week just closed was one of the dullest we have experienced for a long time. Buyers are not disposed to purchase to any extent. The lock-out between the puddlers and their employers continues. The result is, there is very little pig iron required to meet the wants of the trade. Prices rule about the same as last week. Until the "little unpleasantness" between the above named parties is adjusted, or some arrangements made to light up the furnaces, the sales of raw irons will necessarily be limited.

The following sales are reported:

BITUMINOUS COAL SMELTED FROM L. S. ORE.

100 tons gray forge	$23 00— cash.
70 tons No. 1 foundry	27 00—4 mos
50 tons open silvery	25 50—4 mos
30 tons silvery	23 00—4 mos
30 tons No. 1 foundry	25 50—4 mos

CHARCOAL.

100 tons Eastern	$26 00— cash.
10 tons H R. No. 2	29 00—4 mos
10 tons cold blast Eastern	38 00—4 mos

CONNELLSVILLE COKE.

50 tons No. 1 foundry	$26 00—4 mos
10 tons No. 1 foundry	25 00— cash.
10 tons No. 2 foundry	23 50— cash.

ANTHRACITE.

10 tons No. 1 foundry	$28 00—4 mos

MUCK BAR

50 tons muck bar	p. t.
20 tons muck bar, C. S.	$38 00—4 mos

BLOOMS.

10 tons Eastern	$69 00—4 mos

CINDER.

1,200 tons cinder	$385 00— cash.

SCRAP IRON.

Dealers report a moderately active market. The sales comprise several hundred tons at prices noted below. The receipts for some days past have been light.

We quote the following as the range of prices :

Car wheels	$24 00@25 00
Light scrap	28 00@30 00
No. 1 axles	38 00@40 00
No. 2 car springs	40 00
No. 1 moulding metal	18 00
No. 1 railroad scrap	28 00
No. 2 railroad scrap	25 00
Stovepipe and light iron	14 00
No. 1 wrought scrap	30 00

METALS.

NEW YORK, March 27, 1875.

Gold Coin.—During the week past, gold has ranged from 115⅛ to 116⅞, and closed yesterday at 116.

Bullion.—Fine silver bar is quoted at $1 25⅜@$1.26⅜ ; gold, per ounce, and fine gold bar, at par $20 67, gold, per ounce, to ¼ per cent. premium.

Copper.—During the week under review the sales have aggregated but very little, mostly at 21½c., which appears to be the nominal quotation. Messrs. JAMES & SHAKESPEARE, London, under date of March 28th, say :—"With the exception of 300 tons Californian Ore at 15/ 9d. for Swansea, no sales are reported in furnace material, either by public sale or private contract. The quantity offering is but moderate, the bulk of the stuff now on the way to this country having been already purchased by the smelters, and chiefly at figures much above present values. On the morning of Friday last, telegrams were received advising the Chili charters for last half of February, as 1500 tons bars and ingots, of which 100 tons of the former for France, the rest coming to England. This news imparted a momentary animation to the market, and bars, which had sold early in the day at £81 cash for good ordinary brands, were dealt in freely at £81 10/, both on said terms and to arrive; even £82 being paid where buyers selected their own marks. This improvement soon passed away; and influenced by sales at low figures for fixed deliveries forward, quotations have fallen about 20/ a ton, with but little inquiry at that reduction. Nothing doing in Australian sorts, and our list prices are nominal. English descriptions are very quiet, and second-hand parcels still offer below smelters' rates."

Tin.—There has been quite a reaction in the London Market. On Thursday, Straits were quoted, by cable, at £90@£91, and L. and F., £94, and the Singapore market had advanced to $24 per picul. There is an active demand, both in England and from the Continent. By mail from London, under date of the 12th inst., we have the following : "The enquiry for English has been somewhat stronger, but the actual business was very small, as most orders were limited below prices which smelters are willing to accept. For Foreign descriptions the demand has again fallen off, and values show a decline of about 1/ 6d. per cwt. from those ruling on the 5th inst.; the quantity, however, now offering for sale, is not excessive, as many holders have withdrawn their parcels from the market in the hope of an improvement taking place, and which may enable them to realize on better terms. On Wednesday last, the Dutch Trading Company announced their bi-monthly sale for 31st inst., declaring 22,800 slabs Banca and 3,000 slabs Billiton as the quantity which will be sold by them on that date."

This market has not, so far, been influenced by the advance abroad, but some parties, feeling that an improvement will come, are refusing to accept prevailing figures. We quote Straits and Refined English, at 21c.@21¼c. gold; L. and F., 20⅜c.@20¾c.; and Banca 25c.@25½c. A very good business has been done during the past week in tin plates, which, however, has not changed prices. We quote charcoal tins at $9.75@$10 gold, per box ; charcoal ternes, $8.75@$9; coke tins, $7.75@$8; and coke ternes, $7 25@$7.75.

Lead.—The demand for consumption has not increased, the sales during the week not aggregating over 200 tons. During the latter part of last week, 2,600 tons of Selby Lead were said to have been sold, although it appears to be generally believed, that it was only a move to advance prices, and it is undecided as to whether it was a *bona fide* transaction. However, if has resulted in nominally advancing the market to $5.87½, gold, but this figure does not appear to meet buyers' views, and unless a fair demand starts up soon, some other move will have to be taken to maintain it. Foreign is very quiet at $6.75 gold.

Spelter and Zinc.—We note a sale of 20 tons of Western at 6½c., currency. One manufacturer who has been offering at a very low rate, is not working now, and prices may be quoted at 6¾c.@6¾c. The market is much more firm, partly owing to an effort being made by the Western manufacturers to form a combination to sustain prices. There is but a small stock of foreign in this market and it is being held at 7¼c, gold. Sheet zinc is quiet at 9c.@9¼c., gold.

Antimony.—There is but little doing in this article, which is quoted at 12¾c.@12¾c., gold.

Quicksilver.—There has been a marked decline during the week, both in this market and at San Francisco. Prices are quite nominal. The London market, according to mail advices, dated the 12th instant, had declined to £20 per flask of 75 lb.

FINANCIAL.

New York Stocks.

March 24, 1875.

The New York Stock Market has been very active and buoyant during the past week. Sales of stocks and bonds have been very extensive at gradually advancing figures, the market for all securities closing firm. The following announcement of an assessment of the Mariposa Mining Company is just issued:

"Persons holding certificates of the preferred and common stock in the Mariposa Land and Mining Company will please take notice that an assessment of $1 per share has been levied, payable on or before April 14, 1875, at the principal office in San Francisco, or at No. 9 Nassau street, New York. Indorsement will be made upon the certificates when paid."

	Highest.	Lowest.	Closing.
Pennsylvania Coal Co	—	—	245
Consolidation Coal Co	50	44¼	49½
Spring Mt. Coal Co	—	—	67
American Coal Co	—	—	58
Maryland Coal Co	18½	18	18½
Cumberland Coal and Iron Co	—	—	—
N. Y. & Nova Scotia Iron Co	—	—	116
Del., Lack. & West. R.R. Co	112	111	111¾
New Jersey Central R. R. Co	111	110¾	110¾
Delaware and Hudson Canal Co	113⅞	110¾	113⅛
Quicksilver Mining Co. prefrd	—	—	40
" " " Common	33½	33	33¾
Mariposa Land & Mining Co	5½	3½	3½
St. Louis & Iron Mountain R. R.	—	—	15½
Wilkes-Barre Coal Co	—	—	40

Sales for the week, ending the 24th inst., inclusive, were as follows :

	Shares.	Price.
Del., Lack. and W. RR	1,700	at from 111 to 112
Del. and Hudson Canal	173	" 110¾ " 113⅞
New Jersey Central RR	289	" 110½ " 111
Quicksilver Mining Co	1,000	" 33 " 33½
Consolidation Coal Co	3,400	" 44¼ " 50
Mariposa Land & Mining Co	700	" 3½ " 5⅜
Maryland Coal Co	500	" 18 " 18½
St. Louis & Iron Mountain R. R	....	" .. "...
Spring Mountain Coal Co	....	" .. "...
Quicksilver Mining Co., prefd	200	" 40 "...
Pennsylvania Coal Co	....	" .. "...
Total Sales	7,962	shares.

The following are the sales of bonds for the same period :

	Amount.	Price.
Del., Lack. & W. RR. convertible,	$ 5,000	at from 111 to ...
N. J. Central RR. 1st consolidated mortgage bonds	17,000	" 105⅜ " 105¾
St. Louis & Iron Mount'n 1st Mtg bonds,	10,000	" 85 "...
St. Louis & Iron Mountain, 2d Mtg. bonds	5,000	" 55 "...
N. J. Central C.C.	6,000	" 113⅞ "...
" " 1st Mtg. N.	1,000	" 109⅛ "...
Del. & Hudson Canal, 1st Mtg. Reg. bonds, 1891	....	" .. "...
Del. & Hudson Canal, 1st Mtg Reg. bonds, 1891	15,000	" 107½ " 108¼
Del. Lack. & W. R. R., 2d Mtg.	4,000	" 109 "...
C. & O. R.R. 1st Mtg. Coupon	....	" .. "...

Philadelphia Stocks.

March 23, 1875.

The Philadelphia Stock Market has been generally steady during the week, with an inclination to advance, both stocks and bonds closing firm. We note some recent quotations of the Emaus Iron Company at $48, and the Cambria Iron Company at 17½. The Washington Gas Company's stock is quoted at $39 per share. We also note some recent transactions of the Susquehanna Coal Company's bonds at 65.

The Reading Railroad Company has leased the Reading and Lehigh Railroad for 99 years. The movement is not of much moment. The leased road is a short spur, running from Reading to Slatington, and, we believe, had been once or twice sold out. It may be worth something to the Reading Railroad Company, but little, if anything, to any other party.

The Philadelphia and Reading Railroad Company announces a quarterly dividend of 2½ per cent., or $1¼ per share, payable April 26. The transfer books will be closed on the 31st inst., and reopened on April 12.

A special meeting of the stockholders of the Lehigh Coal and Navigation Company recently adopted the alterations in the by-laws proposed at the annual meeting. The alterations are only such as to meet the altered condition of the Company from what it was when the by-laws were adopted, many years ago, when the Company was sole and independent of all connections, and not as now, closely allied with other large and controlling interests.

Quotations are as follows :

	Lowest.	Highest.	Closing.
Reading R. R. Co	57	57¾	57
Lehigh Valley R. R. Co	63½	64	63¾
Little Schuylkill R. R.	—	—	49
Catawissa R.R.	—	—	20
" " Preferred	—	—	43½
" " New Preferred	—	—	39
Huntingdon and B. T. R.R.	—	—	8
" " " " Preferred.	15	15⅜	15⅜
Minehill R.R.	—	—	53
Lehigh Coal and Navigation Canal	50	50¾	50½
Morris Canal	—	—	50½
" Preferred	—	—	128½
Pennsylvania Canal	—	—	9
Schuylkill Navigation Canal	—	—	7⅜
" " Preferred	14¾	14⅞	14⅝
Susquehanna Canal	—	—	7
Westmoreland Coal Co	—	—	—
Buck Mountain Coal Co	—	—	—
Cambria Iron Co	—	—	18
Locust Mountain Coal Co	—	—	—
Emaus Iron Co	—	—	—

The following are the aggregate sales of stocks for the week ending March 23 :

	Shares.	Price.
Reading Railroad	2,925	at from 57 to 57¾
Lehigh Valley RR. Co	95	" 63½ " 64
Little Schuylkill RR.	70	" 49 " —
Catawissa RR.	....	" — " —
" " preferred	....	" — " —
" " new preferred	128	" 39 " —
Huntington & B. T. R. R.	20	" 8 " —
Huntington and B. T. RR., p'f'd	433	" 15 " 15⅜
Minehill RR.	432	" 53 " —
Lehigh Coal and Navigation Canal	15,571	" 50 " 50¾
Schuylkill Navigation Canal	....	" — " —
" " " p'f'd	280	" 14¾ " 14⅞
Morris Canal, preferred	....	" — " —
Susquehanna Coal Co	....	" — " —
Cambria Iron Co	....	" —
Pennsylvania Canal	....	" —
Total sales	19,054	shares.

Sales of the various bonds for the period under review have been as follows :

	Amount.	Price.
Reading RR. 7s, '93	$8,000	at 108¼ to 109
Catawissa RR., new 7s	10,000	" 104½ " ....
H. and B. T. RR., 1st mortgage, 7s	....	" .. " ....
Lehigh convt. gold loan	....	" .. " ....
Pa. and N. Y. Canal, 7s	4,000	" 106¼ " ....
Schuyl. Nav. 6s, '82	500	" 80 " ....
L. V. RR. 6s, coup	....	" .. " ....
H. and B. T. 1st Con. bonds	....	" .. " ....
R. C and I. Co. irregular mort. bonds, Bill Tract	....	" .. " ....
Lehigh Nav. 6s, 1884	1,000	" 103 " ....
Reading RR. debenture bonds	700	" 81 " ....
" " R. G. M. 7s, coup	....	" .. " ....
" " new convertible 7s	6,000	" 106 " ....
Reading C. and I. Co. debenture bonds	5,000	" 84½ " ....
Reading C. and I. Co. mort. bonds, Tamaqua Tract	1,000	" 90 " ....
Reading C. and I. Co. mort. bonds, St. Clair Tract	....	" .. " ....
R. C. & I. Co, Wetherill tract	5,000	" 98 " ....
" " " " Locust Mountain Summit Improvement tract	....	" .. " ....
R. C. & J. Co. Helfenstim tract	....	" .. " ....
Lehigh Valley RR. 6s, registered	....	" .. " ....
" " " 7s	3,000	" 107½ " 108
Lehigh Coal & Nav. Co. 6s, gold loan	10,500	" 101 " 101¼
" " " " 6s, RR. loan	5,800	" 100½ " ....
" " " " 6s, 1884	900	" 99½ " ....
Schuylkill Nav. 6s, '95	4,000	" 79⅜ " 79¾
" " 7 per cent. boat loan	2,000	" 93 " ....
" " 6 " " " "	1,000	" 94 " ....
" " Div'd scrip	....	" .. " ....
R. C. & I. Co., Gleutworth tract	....	" .. " ....
Chesapeake & Delaware Canal, 6s	....	" .. " ....
Susquehanna Canal, 6s	1,000	" 77 " ....
Pennsylvania Canal, 6s	....	" .. " ....
Shamokin Valley & Pottsville R.R., 7s	....	" .. " ....
Allegheny Valley 7 3-10s	12,000	" 92½ " 92¾
" " " Eastern Exte'n	....	" .. " ....
Del. Div. Canal, 6s	....	" .. " ....

Gold and Silver Stocks.

SAN FRANCISCO, March 24, 1875.

Excepting a decline of $1 per share in Belcher, and the same amount also in Alpha, the San Francisco stock list shows an advance. Savage is quoted at $138 per share—an advance of $23 per share from our quotations of the 17th inst. An assessment of $3 per share has been levied by the Overman Mining Company, delinquent March 16.

Quotations, March 24, 1875 :

Gould & Curry	19	Raymond & Ely	44
Savage	138	Eureka G. V.	8
Chollar Potosi	60	Best & Belcher	52
Ophir	109	Kentuck	15
Hale and Norcross	48	Meadow Valley	8
Crown Point	30	Alpha	18
Yellow Jacket	89	Sierra Nevada	12
Belcher	34	Union Consolidated	9
Imperial	8	Mexican	29
Consolidated Virginia	445	Caledonia	18
California	63	Silver Hill	9
Overman	52		

Copper Stocks.

BOSTON, March 25, 1875.

The tendency of copper stocks is rather to lower prices, with a decline in transactions. The sales yesterday were confined to slight transfers of Calumet and Hecla, at from $147½ to $148, and also of Allouez, at $7 per share. A sale of the St. Clair Mining Company, amounting to 500 shares, brought two cents per share.

Quotations are as follows:

Allouez	7¼	Pewabic	—
Calumet and Hecla Co.	147½	Phœnix	14
Copper Falls	8¾	Quincy	36
Central	23	Ridge	6
Franklin	—	Rockland	1

American Institute of Mining Engineers.

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III. Blank proposals for membership can be had on application to the Secretary.

IV. The second volume of Transactions has been mailed to all home members and associates not in arrears. Any member who failed to receive his copy will please notify the Secretary promptly. The Institute is not responsible for the loss of the volume in those cases where members have changed their residences and have omitted to inform the Secretary. Volumes I. and II. will be sent, post-paid, to non-members, at five dollars each.

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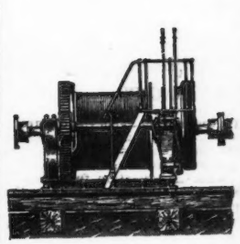

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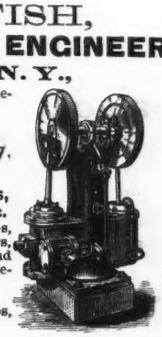

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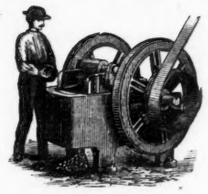

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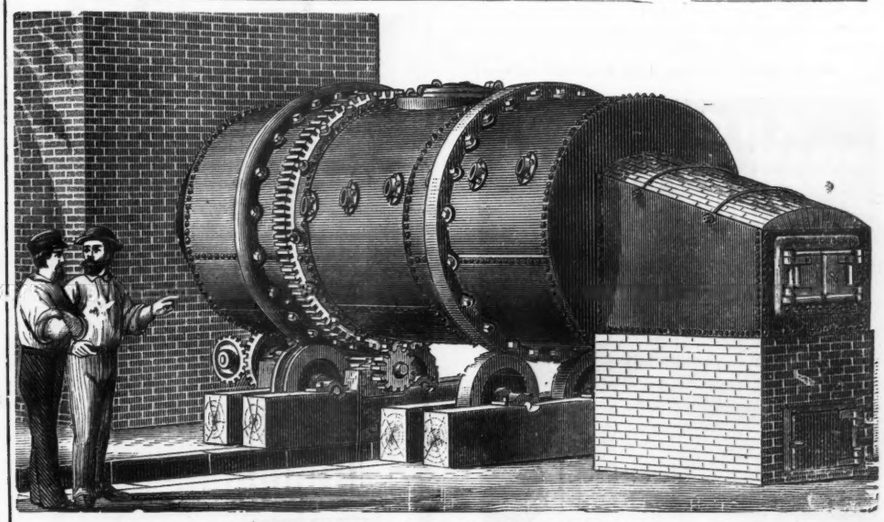

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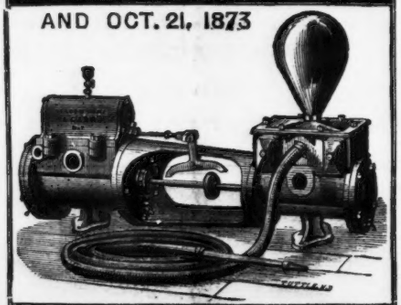

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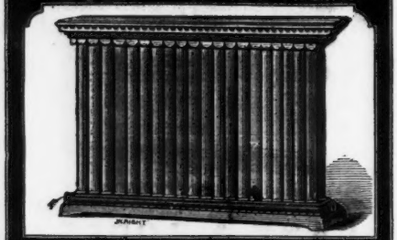

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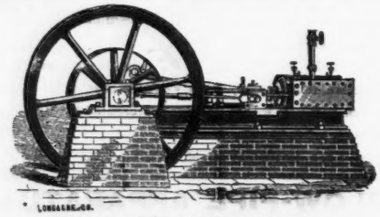

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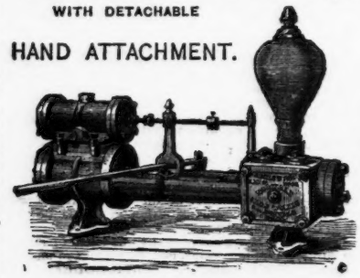

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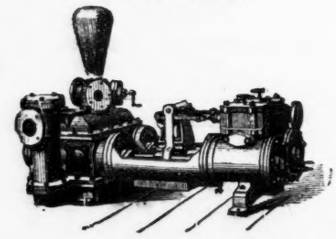

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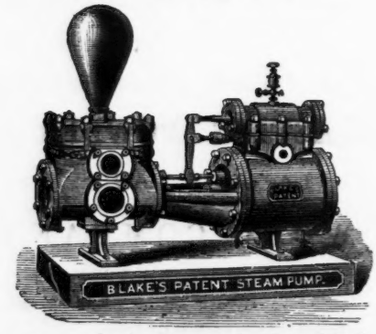

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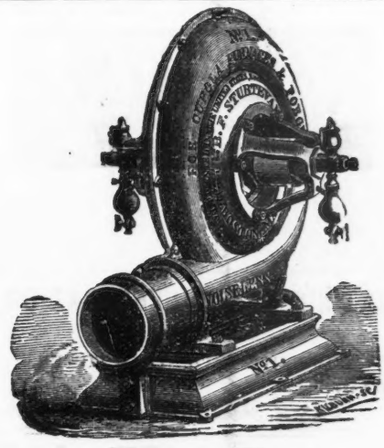

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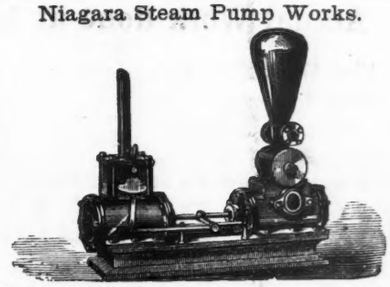

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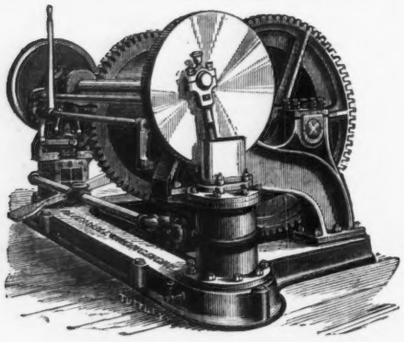

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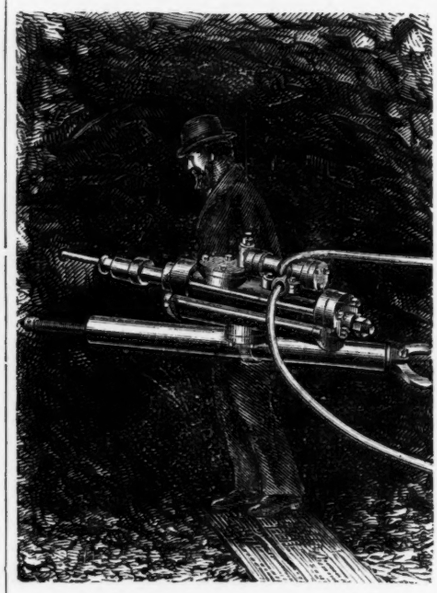

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545 "

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(Copy.)
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MINEVILLE, N. Y., May 8th, 1874.

J. B. WARING, Esq., 133 Centre street, N. Y.

Dear Sir:—Yours of the 4th inst. is received, and in reply beg to hand you the accompanying recommendation of your drill. I saw your drill on trial with several others in the Port Henry Iron Ore Co. mines adjoining Witherbees, Sherman & Co.'s, and find it to be an A No. 1 machine, and works entirely to my satisfaction. I think it capable of doing the work of sixteen men easily. Yours truly,
(Signed,) WALTER TEFFT, Sup't.

(Copy.)
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